

Old
Series,
Vol. LX

CONTINUATION OF THE
BULLETIN OF THE NUTTALL ORNITHOLOGICAL CLUB

New
Series,
Vol. LII

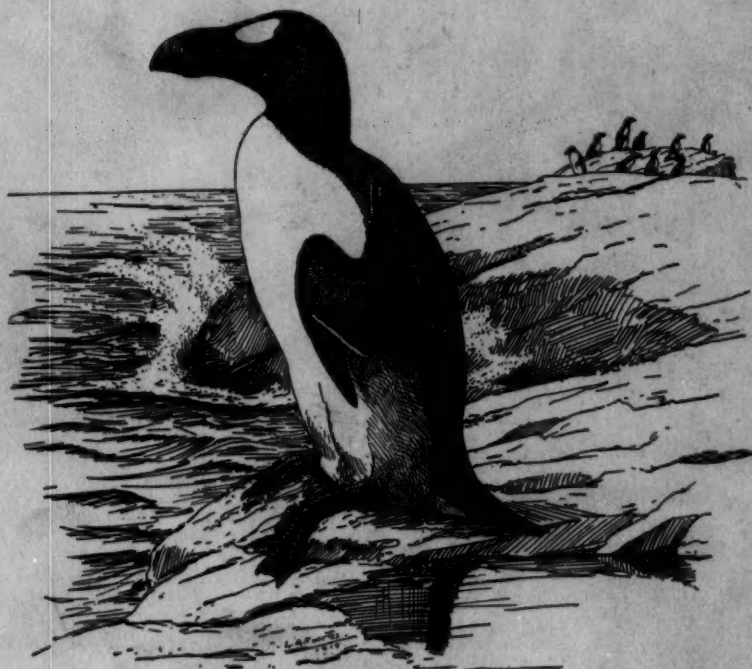
The Auk

A Quarterly Journal of Ornithology

Vol. LII

JULY, 1935

No. 3

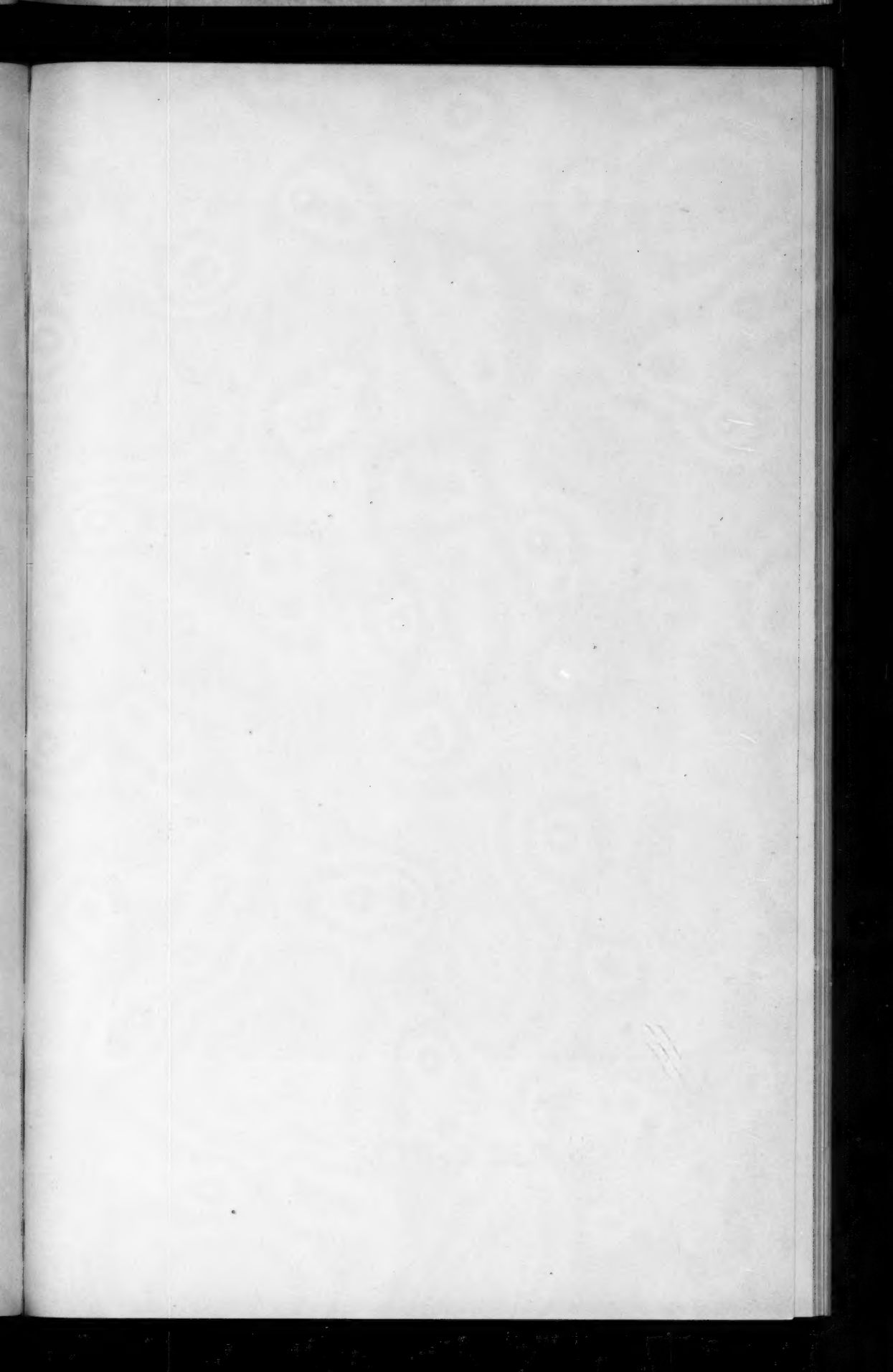


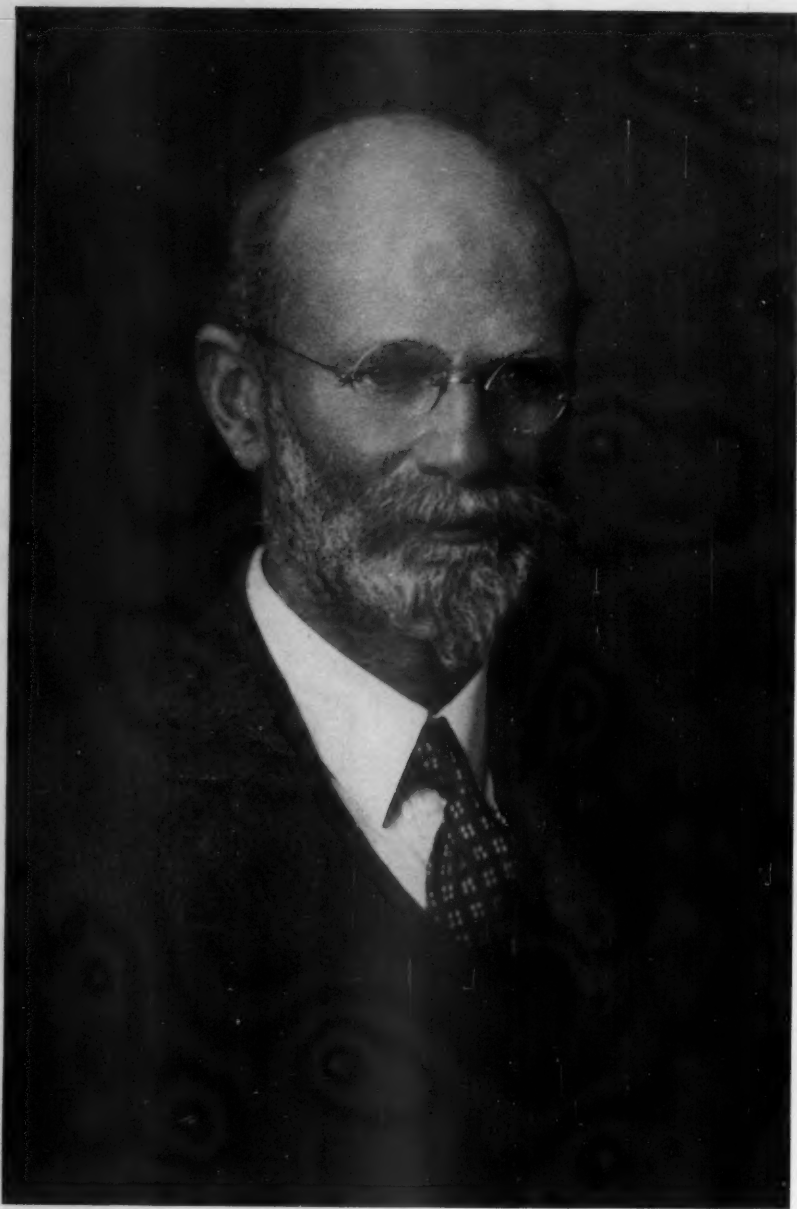
PUBLISHED BY
The American Ornithologists' Union
LANCASTER, PA.

Entered as second-class mail matter in the Post Office at Lancaster, Pa.

CONTENTS.

IN MEMORIAM: CHARLES WENDELL TOWNSEND. By <i>Glover M. Allen</i> . (Plate VIII)	227
THE HAWK MIGRATION DURING THE FALL OF 1934, ALONG THE KITTATINNY RIDGE IN PENNSYLVANIA. By <i>Maurice Broun</i> . (Plate IX).	233
FEBRUARY BIRD LIFE OF PUNTA PENASCOSA, SONORA, MEXICO. By <i>Laurence M. Huey</i> . (Plates X-XI)	249
HELPERS AT THE NEST. By <i>Alexander F. Skutch</i> . (Plate XII)	257
A NEW JAY OF THE GENUS <i>CYANOCORAX</i> FROM SINALOA, MEXICO. By <i>Robert T. Moore</i> . (Plate XIII)	274
AN EXPERIMENTAL STUDY OF SEX RECOGNITION IN BIRDS. By <i>G. K. Noble and William Vogt</i> . (Plates XIV-XV)	278
NOTES ON THE GROWTH, BEHAVIOR AND TAMING OF YOUNG MARSH HAWKS. By <i>Lewis O. Shelley</i>	287
GENERAL NOTES.—The Common Loon in the Florida Keys, 300; The Water-turkey in Clarke County, Georgia, 300; Spring Migration of the Gannet in Southeast Florida, 300; Double-crested Cormorants at Harrisburg, Pa., 300; A Migration of Mute Swans, 301; Whistling Swans, 302; Snow Geese near Washington, D. C., 302; Another Blue Goose from Georgia, 302; The Oldsquaw in the Interior of Alabama, 302; Ducks in Chimneys, 303; Black Vultures in Indiana, 303; An Exhausted Sharp-shinned Hawk, 304; Northern Bald Eagle: an Addition to the New Hampshire List, 305; Notes on the Black Pigeon Hawk, 305; Albinism Among New Hampshire Ring-necked Pheasants, 307; Does the Female Woodcock ever Sky Dance?, 307; Second Recorded Nesting of the Laughing Gull on the South Carolina Coast, 308; A Flight of Common Terns at Harrisburg, Pa., 309; The Noddy at Charleston, S. C., 309; Additional Dovekie Weights, 309; Early Nesting of the Great Horned Owl, 309; Snowy Owl Migration—1934-1935, 310; The Yellow-bellied Sapsucker and the Ruby-throated Hummingbird as Commensals, 310; Migrational Dates of Purple Martins, 310; Ravens in the Kittatinny Ridge of Pennsylvania, 311; Eastern Hermit Thrush in Song in Florida, 311; Blue-gray Gnatcatcher at Cambridge, Mass., 311; A New Bird for Idaho, 312; Notes on Breeding Success of Starlings, 312; European Starling Nesting at Savannah, Georgia, 313; The Alaska Yellow Warbler in Kansas, 314; Bay-breasted Warbler in Arkansas, 314; Scarlet Tanager on the Coast of Georgia, 314; An Abnormally Plumaged Cardinal, 314; Clay-colored Sparrow in New York, 315; An Atlantic Song Sparrow from Georgia, 315; The Lapland Longspur: A South Carolina Specimen and a Georgia Sight Record, 315; Lapland Longspur on the Central East Coast of Florida, 315; Some Unusual Records from Aroostook County, Maine, 1934, 316; Notes on the Winter Bird Life of the Delaware Coast, 317; Winter Notes from Coastal North Carolina, 318; Interesting Winter Notes at Lake Mattamuskeet Wild Life Refuge, 319; Notes on Some Unusual Birds in Florida, 320; Additional Notes on Ohio Birds, 321; Shore Birds at Madison, Wisconsin, 323; Some Notes from Arkansas, 324; New Bird Records from Texas, 324; Some Notes from the Panama Canal Zone—Summer 1934, 325; Pre-Colombian Bird Remains from Venezuela, 328; On Paired Ovaries, 329.	
RECENT LITERATURE.—May's 'Hawks of North America,' 331; Howard's 'The Nature of a Bird's World,' 331; Herrick's 'Wild Birds at Home,' 332; Taverner's 'Birds of Canada,' 333; Bergman's 'Birds of Kamtschatka and the Kurile Islands,' 333; Lamond's 'An Aviary on the Plains,' 333; Bird Stamps of All Countries with a Natural History of Each Bird, 334; Tuft's 'Some Common Birds of Nova Scotia,' 334; Glegg's 'A History of the Birds of Middlesex,' 334; Economic Ornithology in Recent Entomological Publications, 335; Mendall on Fish-eating Birds in Maine, 337; Griecom's 'Ornithology of Panama,' 338; Pickwell's 'Bird Studies,' 338; Allen and Brooks on the Tanagers and Finches, 339; Proceedings of the Linnaean Society of New York, 339; New York Bird Day Bulletin, 339; Other Ornithological Publications, 339; The Ornithological Journals, 343.	
CORRESPONDENCE.—Injury-feigning in Nesting Birds, 352.	
OBITUARIES.—Elizabeth Braxton Davenport, 355.	
NOTES AND NEWS.—The Toronto Meeting of the A. O. U., 356; Exhibition of Audubon's Publications, 356; A Catalogue of Bird Artists, 356; Annual Meeting of the Cooper Ornithological Club, 356; Teaching Units of the Emergency Conservation Committee, 357; Annual Meeting of the Delaware Valley Ornithological Club, 357; Anniversary Meeting of the West Chester (Pa.) Bird Club, 357; Announcement of 'The Birds of the Connecticut Valley in Massachusetts,' 357; The Make Up of Popular Scientific Journals, 357; Robert T. Moore, personal mention, 358; Food Habit Research in the Biological Survey, 358.	





Charles W. Townsend



THE AUK:

A QUARTERLY JOURNAL OF
ORNITHOLOGY.

VOL. LII.

JULY, 1935.

No. 3.

IN MEMORIAM: CHARLES WENDELL TOWNSEND.

BY GLOVER M. ALLEN.

Plate VIII.

ONE of the many physicians whose interest in natural history has led them to the closer study of birds, was Charles Wendell Townsend, M.D., who was elected to membership in the American Ornithologists' Union in 1901, and was made a Fellow in 1923. Born in Boston, November 10, 1859, the son of Thomas Davis and Frances Barnard (Smith) Townsend, he was of good old New England stock, for the Townsends came to this country from Norfolk, England, in 1637. His interest in birds began in youth, for already in his early years as a student at Harvard College we find him afield, often with his brother William, collecting birds, making an occasional Duck-hunting excursion, excavating shell-heaps on Mt. Desert Island, rowing, swimming, camping out as opportunity offered. At that time bird collecting was more emphasized than observing; nearly every budding ornithologist had his prized collection of eggs or skins, and in this he was no exception, but added to a healthy enjoyment of outdoor sports and shooting, a real interest in the birds he secured. While still a freshman at College, he became in 1877, a member of the Nuttall Ornithological Club of Cambridge, then newly organized, and his first ornithological publication was a brief note in the Club's 'Bulletin' of January 1880, on the capture of a Lark Sparrow by his brother and of a Philadelphia Vireo by himself in Massachusetts. In the following year he had a second note in the 'Bulletin,' on the discovery of Wild Turkey remains in Mt. Desert shell-heaps, followed in 1884 and 1885 by other short notices of interesting finds. In those days, Maynard's 'Naturalist's Guide,' with its list of birds of eastern Massachusetts, was the *vade mecum* of the beginner in the study of birds, for excepting Samuels' work on New England, there were no popular books of reference on the subject; binoculars had not been invented, and the 'bird in the hand' was considered the only safe means of field identification.

In later years Dr. Townsend often referred fondly to his cherished first edition of the 'Guide' and its association with his early interest in birds. By its aid his skilful fingers had learned to make an excellent 'skin' in a very brief space of time, and the small collection begun as a young man he cherished and added to from time to time through the later years.

Graduating from Harvard College in the class of 1881, he turned naturally to the study of medicine, for not only was his interest already well directed toward biological lines but this profession was traditional on his paternal side, for his grandfather, Solomon Davis Townsend, was a surgeon, and his great-grandfather, David Townsend, was a well-known surgeon during the American Revolution. He therefore entered the Harvard Medical School in the autumn of 1881 and completed the four-years' course, receiving his degree of Doctor of Medicine in 1885. He stood well in scholarship and in 1928 was elected an Honorary Member of the Phi Beta Kappa. In the years following 1885 the exacting nature of his medical duties occupied his full attention. As assistant in obstetrics at the Harvard Medical School (1887-97), physician to the out-patients department of the Children's Hospital (1887-1903), the Boston Lying-in Hospital (1887-98), and Massachusetts General Hospital (1891-1909) as well as in other medical work, he devoted himself unflinchingly to his profession, eventually becoming recognized as one of Boston's most skilful obstetricians and an authority on the nutrition of children. In 1891 he married Gertrude Flint of Brookline and in subsequent years built up a large private practice in Boston where his young family of three daughters and a son grew up. During these busy times of professional occupation, he found little or no opportunity for birds, and even dropped out temporarily from membership in the Nuttall Club.

What may be called the second period of his ornithological career began about 1892, when, attracted by the natural beauty of Ipswich, Massachusetts, he built there a house for summer occupancy, on a ridge overlooking a wide expanse of salt marsh, beyond which lay the white sands and green beach grass of the dunes, with open sea to the eastward. Here with his family he spent summer vacations and week-ends, "commuting" to and from Boston in pursuance of his professional duties. At Ipswich there was always much to do—tramping over the hills, along the beach or through the dunes, boating and swimming in the broad tide creek close at hand, clam-bakes on the beach, or picnics on the nearby hills, always with an eye for the birds, particularly those of sea and shore, in their spring and autumn passages. With increasing enthusiasm he now devoted himself more and more to field observations at every opportunity. His quick eye was keen to detect the characteristic marks and attitudes of the water and shore birds, groups in which he was especially interested. He was wont to contrast the method of earlier days when the gun was an ornithologist's chief companion,

with these later years when binoculars and telescope take its place. He appreciated fully the value of careful notes made on the spot at the time, and always carried a small memorandum book with detachable leaves in which he made his record of birds seen on each excursion or entered on separate pages the observations on single species. These pages were later filed in small envelopes, one for each species, arranged in a card-catalogue box following the order of the Check-List. By this method, in which he took a certain amount of pride, all his important notes on a given bird were available together in compact form. The smallest details interested him, the behavior, posture, song or other notes, characteristic or unusual actions, food habits, and especially traits that might be interpreted from an evolutionary standpoint, such as methods of holding the feet in flight, use of wings in diving, and such. He had not the time nor perhaps the patience for extended and minute studies of bird routine to be made from observation blinds, but combined his own activity with discovering that of the birds, to obtain broader "impressions" of bird life.

The Ipswich region is unique in its combination of varied conditions of land and water with picturesqueness of appearance. The low rounded hills of glacial gravels were long ago turned to pastures, for Ipswich was settled early in the history of white occupation. Generations of cattle and in former days, of sheep have grazed its downs and the ancient forests, once destroyed, have only in recent years been partly replanted. The wide stretches of open and varied surface tend to give an illusion of great spaces. The Ipswich and Essex Rivers transecting the rolling hills, add the charm of fresh water, while the long barrier beach of white sands fronting the sea, protects broad salt marshes with their muddy creeks and abundant growth of marsh grass on the flats. Such an area is never still. The tidal creeks fill twice daily, flooding the expanse of marsh, the wind is ever blowing the shifting sand, and the restless sea pulls down and builds up the shores. In this constant activity of elemental forces Dr. Townsend took the keenest interest. He was familiar with the aspects of the place at all times of year and under all conditions. On week ends in autumn, winter, or spring, often with one or two congenial companions, he would escape from the congested city to the Ipswich haven. In fair weather or foul, rain, shine or snow, the long tramp across fields and byways from the town brought one at length to the hospitable shelter of the cottage; the stove was soon going, supper eaten, and then to bed for an early start in the morning, often on winter nights with a hot brick wrapped in a cloth for a bed companion! Sunrise would find him cooking a camper's breakfast, ready for a forenoon's tramp through the dunes. As an outgrowth of the Ipswich experiences, he published in 1905 his 'Birds of Essex County' (Memoirs of the Nuttall Ornithological Club, No. 3). This, his first extensive contribution to natural

history, records many observations, carried out over a series of years, not only on the bird life of the region but on the local conditions of animal and plant life as well. The shifting of the dunes he measured over a series of years, and recorded the effects on the surrounding flora and fauna; the formation of an artificial pond and its development, with new cattail swamps and buttonwood thickets, bringing in new animal life, was watched by him with growing interest. Many of these observations were chronicled in this memoir, which has been specially commended by a well-known naturalist as an outstanding contribution to the ecology of a circumscribed area. In 1920 he published a 'Supplement' to the list and later prepared two books—'Sand Dunes and Salt Marshes' and 'Beach Grass,'—giving a general account of the natural history of the area in a series of brief informal sketches.

What might appropriately be called the third or travel period of Dr. Townsend's ornithological career, begins perhaps in 1906, when with the writer, he made a summer's journey by mail steamer along the eastern coast of Labrador, notes on which, together with a list of the birds of the peninsula, we published in the following year. As a boy he had read with eagerness Audubon's account of his visit to these barren shores and ever since had longed to see them for himself. As was his wont, he filled every moment of the trip with activity, and when we were not afield would produce a pad of yellow paper and with facile pen wrote on the spot a running narrative of the things that had most impressed him. At the close of our summer's journey the manuscript of his first formal book—'Along the Labrador Coast' (1907)—was nearly ready for the printer, a colorful and charming account of the coast, its people and its bird life, impressions mainly, to be sure, but nevertheless a permanent record of value. In 1909, three years later, in company with Arthur C. Bent, he undertook a second visit, this time starting early in the season in order to be in time for the opening of spring in southern Labrador. Leaving Quebec by the mail steamer he made the journey down the Gulf of St. Lawrence to Natashquan and return and as before, recorded his impressions of the North Shore in a second small volume entitled 'A Labrador Spring' (1910). In 1911 he prepared an abridged and annotated edition of Captain Cartwright's 'Journal' kept during his attempt to establish a settlement on this coast at Cape Charles, published in three volumes in 1792, bringing together especially the natural history notes. He was now imbued with the desire to undertake a modest exploration of this rugged country in a more independent manner, for it appealed to him most strongly. Accordingly in July 1912, he made a canoe journey with a guide up the Natashquan River for some eighty miles into the wilderness during four weeks of almost continuously stormy weather, an account of which he prepared for the American Geo-

graphical Society. Three years later, with Dr. Harold St. John, he filled in the remainder of the south coast of Labrador by a journey from Natashquan eastward to Blanc Sablon, following, as he delighted to recall, in the footsteps of Audubon who skirted these coasts in the previous century. Again a small volume, 'In Audubon's Labrador,' chronicled his impressions, and he also appeared in print with a strong plea for better protection of the breeding Eider Ducks along these shores. In following years he made several shorter excursions to the North Country,—Gaspé, the Shickshocks, Grand Manan, and the Bay of Fundy, sometimes accompanied by his wife, and so became familiar with much of this rugged area and its bird life. A number of short papers came from his pen as a result of these journeys, although the only bird to which he gave a new name, proved to be merely the little-known immature plumage of the Hudsonian Chickadee. Other brief contributions included papers on the courtship actions particularly of the Ducks, to which he gave special attention; even the habits of Pigeons and House Sparrows in the city engaged his observation.

Few men live to carry out their cherished plans for peace and opportunity to study in their later years, but he was an exception. He had often expressed to me his desire to retire from active practice and live in his beloved Ipswich the year round in closer contact with its natural attractions while still well able to enjoy them. This cherished desire he finally accomplished and following the death of his wife in 1917, gave up his medical work and devoted himself to study and travel, making his residence at the Ipswich home. In 1919 he married his sister-in-law, Sarah G. Flint, who died in 1924. In 1925 he again followed Audubon's track, making a journey down the Ohio and Mississippi Rivers by river-boat and visiting the southern states to see their abundant winter bird life. In 1926 and 1927 he made a journey by steamer around the world in a leisurely way, stopping at the Hawaiian Islands, Japan, China, Java and Ceylon. The years 1928-29 found him voyaging once more through the Panama Canal and down the west coast of South America, thence across Argentina to the Atlantic side of the continent, and by boat home. The impressions of this journey he embodied in another volume of informal narrative, 'From Panama to Patagonia' (1931). Again in 1931 and 1932 he extended his travels by a tour around the African continent, stopping at various regulation points on the Mediterranean and East African coasts, with occasional side excursions inland.

He seemed still the embodiment of vigorous health when an internal disorder developed, which notwithstanding his strong constitution, eventually proved fatal. Even to within a few days of his death (on April 3, 1934) his active pen was busy preparing notes from his field observations. A strong, positive nature, generous of heart, active in mind and body, ever

quick to see the humor of a situation, he was a delightful companion in the field and a keen observer. His many contributions to ornithology exemplify how much a busy professional worker may accomplish through the life-long habit of using spare moments to advantage.

Dr. Townsend affiliated himself with many other scientific societies in addition to those maintained by the medical profession. He was a valued member of the Nuttall Ornithological Club and served for a time as a vice-president and as a member of the Council; he was also a member of the Cooper Ornithological Club, the Wilson Ornithological Club, the Deutsche Ornithologische Gesellschaft, and a charter member of the Essex County Ornithological Club. In addition he was a member of the Boston Society of Natural History and at the time of his death, a director of the Massachusetts Audubon Society.

*Museum of Comparative Zoölogy
Cambridge, Mass.*

THE HAWK MIGRATION DURING THE FALL OF 1934, ALONG
THE KITTATINNY RIDGE IN PENNSYLVANIA.

BY MAURICE BROWN.

Plate IX.

UNTIL recent years the extensive fall migrations of Hawks along the Kittatinny Ridge appear to have been unknown to ornithologists. Yet each year, over a long period of time, hunters have taken heavy toll of the migrating Hawks at a number of places along the ridge, which follows a northeast and southwest course for hundreds of miles from northern New Jersey to the southern states.

By far the most popular shooting grounds along this migratory highway were located between the villages of Eckville and Dreherstown, in east-central Pennsylvania. The U. S. topographic maps give the name of "Blue Mountain" to a large section of this part of the ridge. Hunters gathered here in large numbers—as many as 150 to 200 on a Sunday, and perhaps half as many on a week day—throughout the period of Hawk migration, which extends from late August to December. Many of these men came from points a hundred miles or more distant, so attractive was this "sport" to the hunting fraternity.

The result was an appalling slaughter. The victims were rarely retrieved—merely left to rot, and if wounded, to die a lingering death, and eventually all were consumed by four-footed scavengers. It has been estimated conservatively that from 3,000 to 5,000 birds of prey were killed each fall. The number was undoubtedly much larger before the depression. Hunters with whom I discussed the situation expressed the view that during the last two or three years less than a quarter of the numbers of Hawks went by as did ten years ago. Most of the men interviewed said that these "Hawk-shoots" had been going on for over twenty years. During the past few years they had been well advertised in local sportsmen's organizations by a couple of enterprising business men in a nearby city. Each fall these men drove a truck-load of ammunition up the mountain and made a small fortune selling their wares at much-reduced prices. Other men, equally anxious to profit, gathered and burned the used shells, in order to salvage the brass for whatever mintage they could get!

The earliest published information that we have in regard to the Hawk migrations, is found in an interesting paper by George M. Sutton, in which the author tells of a visit to the mountain (above Dreherstown) on October 19 and 20, 1927. Data are presented concerning plumage differences, weights, and stomach examinations of 158 Hawks of four species, all col-

lected in a remarkably short period of time.¹ During the fall of 1932, R. H. Pough,² and H. H. Collins, Jr.,³ made several visits to the region, making extensive investigations into the Hawk destruction. For a very full and graphic account of the devastation, the reader is referred to Collins' article. The first definite information concerning the nature and extent of the local Hawk migrations is found in a brief, but comprehensive paper by Earl L. Poole⁴ who has been familiar with the locality for a number of years.

In the late summer of 1934, before the Hawks began to appear in appreciable numbers, this shooting paradise of the hunters was turned into an inviolate wild life sanctuary, thanks to the active interest and initiative of Mrs. C. N. Edge, of New York City. Mrs. Edge acquired control of 1393 acres of the mountain, the heart of which property held the Hawk shooting-stands. The writer was directed by Mrs. Edge to supervise the sanctuary, and as far as possible to make daily observations of the Hawk migration.

I arrived at "Hawk Mountain," as it is known to the hunters throughout the region, on September 10. Hunters were already on the grounds. The following day "no trespassing" posters went up everywhere along the steep and difficult road that led to the former shambles. Meanwhile a series of notices appeared in all the local newspapers, apprising the sportsmen and hunters of the newly established refuge and the strict prohibition of all trespassing.

The reader may easily imagine the astonishment of the local hunters, and the opposition that precipitated. The farmers of the surrounding countryside were particularly hostile. Some of them made the preposterous claim that "the Hawks even carried off young pigs," as well as poultry. The sportsmen raised the usual hue and cry that the Hawks had depleted their game. Notwithstanding the outcries of the farmers I found large numbers of White Leghorns and other poultry roaming at large in the fields at the foot of the mountain. Rabbits, Quail, and Pheasants were very plentiful along the borders of the fields. The unusual numbers of Ruffed Grouse in these woods impressed me the most, however. Throughout September and early October they could be heard drumming almost everywhere. On October 1, I recorded 33 Grouse in different parts of the sanctuary.

My first three weeks at the sanctuary were spent in patrolling the road, fortunately the only approach, as all hunters came by automobile. From the amount of adverse discussion in the newspapers, and the rumors that circulated among the farmers in the immediate vicinity, I anticipated trouble

¹ Wilson Bulletin, 1928, pp. 84-95.

² Bird-Lore, 1932, p. 429.

³ Annual Report of The Hawk and Owl Society, Bull. No. 3, 1933, pp. 10-18.

⁴ The Auk, 1934, pp. 17-20.

daily. Only 53 gunners appeared at different times during this period, however, most of them having heard of the sanctuary but desirous of learning for themselves the *status quo*. On September 27 we secured the full-time services of Robert H. Kramer, a deputy-sheriff. Henceforth I was able to spend more time making observations of the flights. From September 10 to November 1, the opening day of the hunting season, we turned away 166 Hawk-hunters, and had no serious trouble in doing so.

The greatest part of the sanctuary lies in Berks County; the western and northern borders of the tract are in Schuylkill County. A rough, dirt road traverses the mountain from Dreherstown. Mounting this road a mile and a half or so to near the summit of the mountain, which is irregular and plateau-like at this point, one finds on the left a well-beaten path running northwards into the rocky woods for a distance of three-quarters of a mile. The path leads to a series of sandstone promontories which jut out along the ridge and form a striking part of the rugged topography. These promontories are the vantage points from which to observe the passing Hawks. Looking up the ridge, which in this region surprisingly enough runs east-northeast to west-southwest, one is deeply impressed by the steep flanks of the mountain, and its virtually razor-back crest. Scrub-oak and black birch, showing the effects of many forest fires, form the dominant tree growth. Interspersed among these are a few hemlocks, and great tangles of rhododendron and mountain laurel. A number of fine specimens of mountain ash (*Pyrus americana*) and of mountain holly (*Ilex monticola*) have found footing among the promontories. On the whole, the scene is that of a much-scarred wilderness, withal presenting one of the most magnificent views to be had anywhere in Pennsylvania.

An explanation for the autumnal flights of Hawks along this particular ridge, the most eastern of the Appalachian Chain, may be found, as pointed out by Poole, in the unbroken character of the ridge, and more specifically in the air-currents that are generated and forced upwards by the wind striking against the steep slopes. These currents of air enable the birds to coast for mile on mile; thus they enjoy easy transit to their winter feeding grounds.

The ridge above Dreherstown offers opportunities for field study of Hawks that cannot be surpassed. The reason for this is the extreme narrowness of this part of the mountain, thereby creating a focal point for the passing birds. Comparative ease of accessibility by automobile and by foot was a great point in its favor for the hunters. As the Hawks progress along the ridge and pass the promontories, alternately coasting or flapping, or circling a moment above the trees, one is keenly aware of the novelty of studying these birds from a position seldom if ever enjoyed by the average student in the field. Whereas the latter is obliged to look up to make

identifications, the observer at "Hawk Mountain" frequently looks *down* upon the birds, or sees them come head-on, sometimes on a level with his position. It is this condition which made the Hawks such easy targets and occasioned their wholesale slaughter.

A question frequently asked is to what extent, if any, do Hawks migrate along this ridge in the spring? We are not prepared to answer. Some hunters have given me a negative view. Others have maintained that the birds straggle up the valleys. At any rate, the hunters have never manifested an interest in the mountain in the spring, although this may be ascribed to dormancy of the desire to hunt. Obviously the only definite knowledge concerning the spring migration of the Hawks will be forthcoming when ornithologists essay to visit the ridge in late March or early April.

I spent approximately 306 hours making observations from the promontories, which by the way, are some 1506 feet elevation. On days of particularly good flights I held a vigil of from eight to nine hours. There is an almost continuous movement, from a few straggling birds on some days to really heavy flights on others, which may however, be of but two or three hours duration. Only when the weather is rainy or very misty is there any break in the migration. Thus, on October 24, a day of overcast skies during the morning, but clear weather with moderate northerly winds in the afternoon, only 10 birds were recorded: 6 Sharp-shins, 1 Red-tail and 3 Marsh Hawks. On October 31 the weather was not particularly favorable for Hawk migration; during seven and a half hours of watchful waiting 176 birds were seen: 21 Sharp-shins, 148 Red-tails, 4 Red-shoulders, 2 Marsh and 1 Turkey Vulture. Of these, 143 passed between 10 A. M. and 1 P. M.

During the early hours of the morning a few birds may always be seen loitering over the ridge, searching for food. By 7.30 or 8 o'clock, providing the weather is favorable, the first birds fly by the promontories. An hour later the flight is well under way. In regard to the time of day the birds pass through in greatest numbers, my observations tally fairly well with those of Poole, who in past years made some eighteen visits to the region. The maximum numbers usually pass during the forenoon, and again from 2 o'clock to about 4.30 o'clock, at which hour they may be seen settling down for the night. The mid-day lull in the migration is probably explained by a feeding and resting period of which the birds avail themselves. This condition is not invariable, however, as my records show a number of days when the hour between noon and 1 o'clock proved the best of the day. Notable instances occurred on October 15, 28, 30 and November 11. It may be of interest to present the lists for two days, in illustration of the foregoing remarks:

Typical—October 25

11 Turkey Vultures	8- 9 A. M..12
1 Goshawk	9-10.....27
42 Sharp-shins	10-11.....64
5 Cooper's	11-12.....20
115 Red-tails	12-1 P. M... 6
3 Red-shoulders	1-2..... 7
4 Marsh Hawks	2-3.....35
1 Unidentified ..	3-3:30...11

182 birds

Infrequent—November 11

4 Goshawks	8- 9 A. M.. 9
15 Sharp-shins	9-10.....48
3 Cooper's	10-11.....31
269 Red-tails	11-12.....27
1 Red-shoulder	12-1 P. M...72
3 Golden Eagles	1-2.....34
1 Marsh Hawk	2-3.....46
	3-4.....28
	4-4:30..... 1

296 birds

According to Poole the earliest migrants, a few Sharp-shins and Broad-wings, arrive the latter part of August. I was able to observe no considerable flights of birds previous to September 23, owing to the close guarding that was necessary on the road. So far as I know, no large flights occurred until September 17, a day of clear, warm weather, with brisk winds from the north. I was informed by two gunners who were on the ridge a few miles away, that they saw between 1500 and 2000 small Hawks pass over during that afternoon. I gathered from their descriptions that the birds were Broad-wings, the species which is expected in large numbers during the latter part of September. Had the wind come from a southerly quarter there is no doubt I would have seen these birds from my position on the road. Invariably when the wind is in that direction the birds pass along the south side of the ridge and cross the "kettle"—a large bowl-shaped area fronting the promontories—thus taking something of a short cut. Having crossed the kettle the birds pass over the road, usually near the summit, and continue on over the broadening back of the mountain, which at length takes a course that is more truly northeast to southwest. A case in point is the flight of Broad-wings that we witnessed from the road on September 23. Not a Hawk of any kind was seen until early afternoon. There had been no wind during the morning, but soon after mid-day light southerly breezes sprang up. Between 3 and 3.30 o'clock we counted 427 Broad-wings pass.

Large flights depend entirely on the weather conditions. As indicated in the chart, a cold, but not necessarily clear day, immediately after rainy weather, with strong winds from northerly quarters (preferably northwest) is most productive. For maximum number of species, I found the second week in October the best. During the nine day period from October 7 to 15, I recorded 16 species of raptores, as many as 13 species on a single day. The greatest numbers of Hawks may be looked for after freezing temperatures and snows have settled over eastern Canada and northern New England.

CHART. (Read across)

Sept. 12	49 Hawks, all flying very high. Partly cloudy; warm and moderate east wind.	Sept. 13-16	Light rains locally. Many showers and storms in North and Middle Atlantic States, and lower temps.*	Sept. 17	"1500 to 2000" Broad-wings (see page 237). Fair; warmer; brisk northerly wind.
Sept. 28	18 to 27 and Oct. 1 to 4—data incomplete. 13 Hawks, flying high. Clear; cool; light west wind.	Sept. 29	Heavy rains in North Atlantic States; no material change in temperature.	Sept. 30	128 Hawks of 9 species, flying low. Cloudy; light n. w. wind; temp. dropped 10°.
Oct. 5	24 Hawks, flying quite high. Cloudy; raw east wind; temp. av. 55°.	Oct. 6	Rains in the Atlantic States; no change in temp.	Oct. 7	107 Hawks of 13 species, flying low. Cloudy; no change in temp.; strong n. w. wind.
Oct. 9	80 birds, at very great height. Clear; warmer; light s. e. wind.	Oct. 10	Heavily overcast and fresh east wind, locally. Rains in Quebec and n. New England; temp. dropping.	Oct. 8	192 birds of 10 species, flying low. Clear; warm; brisk n. w. wind.
Oct. 12	369 birds of 13 species, all passing very high. Fair; cold; strong n. w. wind. Rain and snow in n. New England.	Oct. 14	Rain in Quebec and most of New England and New York. Weather in e. Penna. clear with freezing temperatures and strong n. w. wind. 258 Hawks of 9 species, flying low, generally.	Oct. 11	257 Hawks of 12 species, all flying low. Clear; colder; brisk n. w. wind.
Oct. 13	125 birds of 8 species, flying very high. Fair; cold; strong n. w. wind.			Oct. 15	255 Hawks of 11 species, all flying low. Indian Summer weather; moderate n. w. wind.

* The records of the U. S. Weather Bureau were consulted in the preparation of this chart.

- | | | | | | |
|---------|---|---------|---|------------|---|
| Oct. 16 | 113 Hawks of 8 species, generally very high. Indian Summer day; light s. e. wind. | Oct. 17 | Cloudy and heavy mists locally, and moderate s. w. wind; only 9 birds seen. A disturbance over the Great Lakes, and cold weather in central Canada, otherwise fair weather prevailed in the eastern States. | Oct. 18 | 535 Hawks of 8 species, all flying low. Cloudy; warm; light n. e. wind. Lower temps. in n. New England, and relatively low pressure over eastern Quebec and New Brunswick. |
| Oct. 19 | 189 Hawks of 8 species, all flying very high. Clear; cool; brisk n. w. wind. Fair in the north. | Oct. 21 | Rain in North Atlantic States and showers locally. | Oct. 23 | 571 birds of 9 species, nearly all passing high. Lowering weather; temp. dropping; strong n. e. wind. Rain in New England, New York and Quebec. |
| Oct. 20 | 51 Hawks of 9 species, flying quite high. Clear; colder; moderate n. w. wind. | Oct. 22 | Rain in the North Atlantic States and s. e. Canada, with low over entire region. | Oct. 25 | 182 birds of 7 species, flying low in A. M. Fair; warm; moderate s. e. wind. No change in the north. |
| Oct. 23 | Hawks passing at great height. (See notes above). | Oct. 24 | Lowering weather; warm; moderate n. wind. Clear in the north, but lower temps. | Oct. 28-30 | Over 200 Hawks each day, mostly Red-tails, flying low. Generally cold and cloudy, with fresh n. w. winds during this period. Unimportant weather changes in eastern States. |
| Oct. 25 | Hawks flying low during A. M., usually high during P. M. | Oct. 26 | Rains and falling temps. in North Atlantic States. | | |
| | | Oct. 27 | Rains and snows in northern Appalachian region and the North Atlantic States. A pronounced low over New Brunswick. | | |

- Oct. 31 176 Hawks, mostly Red-tails, flying at varying levels, some very high. Lowering weather; no change in temp., moderate west wind.
- Nov. 3 Hawks passing very high during P. M. Fair; warm; moderate s. wind. Rising temps. in eastern States.
- Nov. 5 Hawks passing at very great height. Clear and mild; light s. w. wind, locally.
- Nov. 6 All Hawks flying high; usually 6 rapidly.
- Nov. 9 39 Hawks, mostly Red-tails, all flying high. Clear; slight drop in temp.; moderate n. w. wind.
- Nov. 12 Hawks flying high generally. Light snow in North Atlantic States.
- Nov. 1 Rain and falling temps. in North Atlantic States. A disturbance over e. Quebec. Low over s. e. New York. In eastern Penna. clear after mid-day.
- Nov. 4 Rain and rising temps. in North and Middle Atlantic States, with considerable disturbance above Gulf of St. Lawrence.
- Nov. 5 A disturbance over North Atlantic States, attended by rain in southern New England, but no change in temp.
- Nov. 7 Light rains in the North Atlantic States, with low pressure area centering over New Brunswick.
- Nov. 10 Rains in northern New England and in the Appalachian region. Low pressure area across Great Lakes, moving eastwards.
- Nov. 13 Snow in northern Appalachian region and New England.
- Nov. 1-3 641 Hawks on 1st, 1013 on the 2d, mostly Red-tails, and flying low. Freezing temps. and strong n. w. winds prevailed. 375 Hawks on the 3d.
- Nov. 5 A straggling movement of only 63 Hawks, occurring mainly in P. M.
- Nov. 6 258 Hawks, mostly Red-tails, flying high. Cloudy; slight drop in temp.; brisk n. wind. Rain in n. New England.
- Nov. 8 59 Hawks, all flying very low. Fair; warmer; light w. wind. Fair weather over all eastern States.
- Nov. 11 296 Hawks, mostly Red-tails, flying low generally. Cloudy; colder; strong n. w. wind. Low over n. New England, and much colder.
- Nov. 12 440 Hawks, mostly Red-tails, flying high generally. Cloudy, with occasional snow squalls; freezing temps. and strong n. w. wind.
- Nov. 14 45 Hawks, mostly Red-tails. Fair; very cold; strong n. w. wind. Migration has definitely begun to peter out.

We have often heard rural folk claim that when the fire-flies are seen high in the air it is a sure token of approaching rain. I was not a little surprised to find that precipitation occurred soon after flights, during which the Hawks were seen higher than two hundred feet or so above the promontories. There were a few days when buteos and accipiters alike travelled so high in the ether as to be barely discernible. Rain of course was not necessarily local, but it was certain to fall elsewhere along the Appalachians or in New England. Thus the passage of high-flying Hawks, as influenced by atmospheric pressure or contrary winds, is succeeded by rains and falling temperatures, usually pronounced in the regions to the north, which in turn precipitate an exodus of birds of prey from those regions. The cyclic nature of the Hawk migrations is apparent in the accompanying chart. Of course there are exceptions to every rule; the only one that is demonstrable in our case is shown for October 16-18, when precipitation failed to occur anywhere in the region in question. It is interesting, nevertheless, that marked meteorological changes took place in the regions adjacent in the west.

As the reader will observe, there were relatively few days when the birds flew high, or well out of range of gun-shot. Undoubtedly during such flights many birds went by unnoticed. Bird students and conservationists may be grateful for just such migrations in the past, for all but these birds flying high were subject to the ceaseless barrage of the hunters. On the many days during my observations when the birds passed low along the ridge, from fifty to seventy-five per cent of the migrants might easily have been killed. Indeed, on some of his visits to the mountain in 1932, Collins estimated that half of the birds that went over were shot. It is quite plain, then, that if the Hawks flew low invariably, certain species would long have become extinct, or nearly so, in the eastern states.

It would be interesting to know how the Hawk flights at Cape May, N. J. compare with those along the Kittatinny Ridge. The migratory status of certain species may be found to offer sharp contrasts. For example, large flights of Pigeon Hawks occur at Cape May, according to many observers; which evidently explains the dearth of this species along the inland route. It is likely that the fall migrations of Hawks at Fisher's Island, N. Y., links up with the Cape May flights. We may safely assume that the bulk of the breeding Hawks of New England, eastern New York, and the easternmost parts of Canada, passes through these two migratory channels. The birds issuing from the western part of this region probably reach the Kittatinny Ridge, with a maximum altitude of 2,000 feet, *via* the Taconic Mountains on the New York-Massachusetts state line and the New York-Connecticut state line, thence along the Shawangunk Mountains, which begin in Ulster County, New York, and continue into New Jersey as the Kittatinny.

The following records of banded Hawks killed along the Kittatinny Ridge or in its general course are of interest in that they throw some light on the origin of some of the migrants. For use of the records I am thankful to Mr. F. C. Lincoln, of the Bureau of Biological Survey. Recoveries of banded Hawks are certainly meager. In this connection it may be recalled that of the thousands of Hawks that were killed above Dreherstown, rarely were any retrieved. All but the Golden Eagle were juvenals when banded.

<i>Species</i>	<i>Band no.</i>	<i>Locality</i>	<i>Date</i>	<i>Bander</i>
1. Red-tailed Hawk	A683598	Huntington, Mass.*	6/13/31	H. E. Woods
2. Red-sh. Hawk	311766	Belchertown, Mass.	6/17/26	E. G. Rowland
3. Broad-winged Hawk	387581	Huntington, Mass.	7/5/26	A. A. Cross
4. Broad-winged Hawk	660558	Huntington, Mass.	7/10/32	A. A. Cross
5. Golden Eagle	323094	Ambler, Penna.	5/10/26	J. R. Gillin
6. Duck Hawk	387576	Huntington, Mass.	6/23/28	A. A. Cross
7. Duck Hawk	228872	Russell, Mass.	6/1/25	Don V. Messer
8. Duck Hawk	204970	Woronoco, Mass.	6/1/24	A. A. Cross
9. Duck Hawk	204971	Woronoco, Mass.	6/1/24	A. A. Cross

<i>Recovery</i>	<i>Date</i>	<i>By whom recovered</i>
1. Branchville, N. J.	10/15/31	Dean L. Haggerty
2. Hanover, Penna.	12/25/26	H. W. Sterner
3. Thornhurst, Penna.	8/18/27	John Yentock
4. Winchester, Va.	9/8/32	Chas. McFarland
5. Berkeley Springs, W. Va.	12/19/26	Lawrence Batt
6. Northumberland, Penna.	10/20/28	C. G. Riggs
7. Nokesville, Va.	2/24/26	J. M. Marmel
8. "Kittatinny Ridge, N. J."	9/28/24	J. Von Lengerke
9. Near York, Penna.	11/—/25	W. F. Maul

* Huntington, Russell and Woronoco are within three or four miles of each other, in western Hampden County, Massachusetts.

In view of the relentless, unceasing persecution which our raptors have been universally subjected to through the years, it is amazing that large numbers may still be seen. It is particularly gratifying that we still have a fairly sound breeding stock of Red-tails, as our data seem to indicate. The rising tide of enlightened sentiment in favor of the Hawks should do much to level out the discrepancies in the laws of the different states. The Massachusetts laws afford protection to each of the species in the above chart. Pennsylvania allows its citizens to mow down these same birds.

Some idea concerning the relative frequency of the different Hawks during migration may be gained from the following list. The figures include for the most part my personal observations, which extended from September 10 through November 13. For a month thereafter, during the course of his duties patrolling the sanctuary, Kramer made daily observations of from

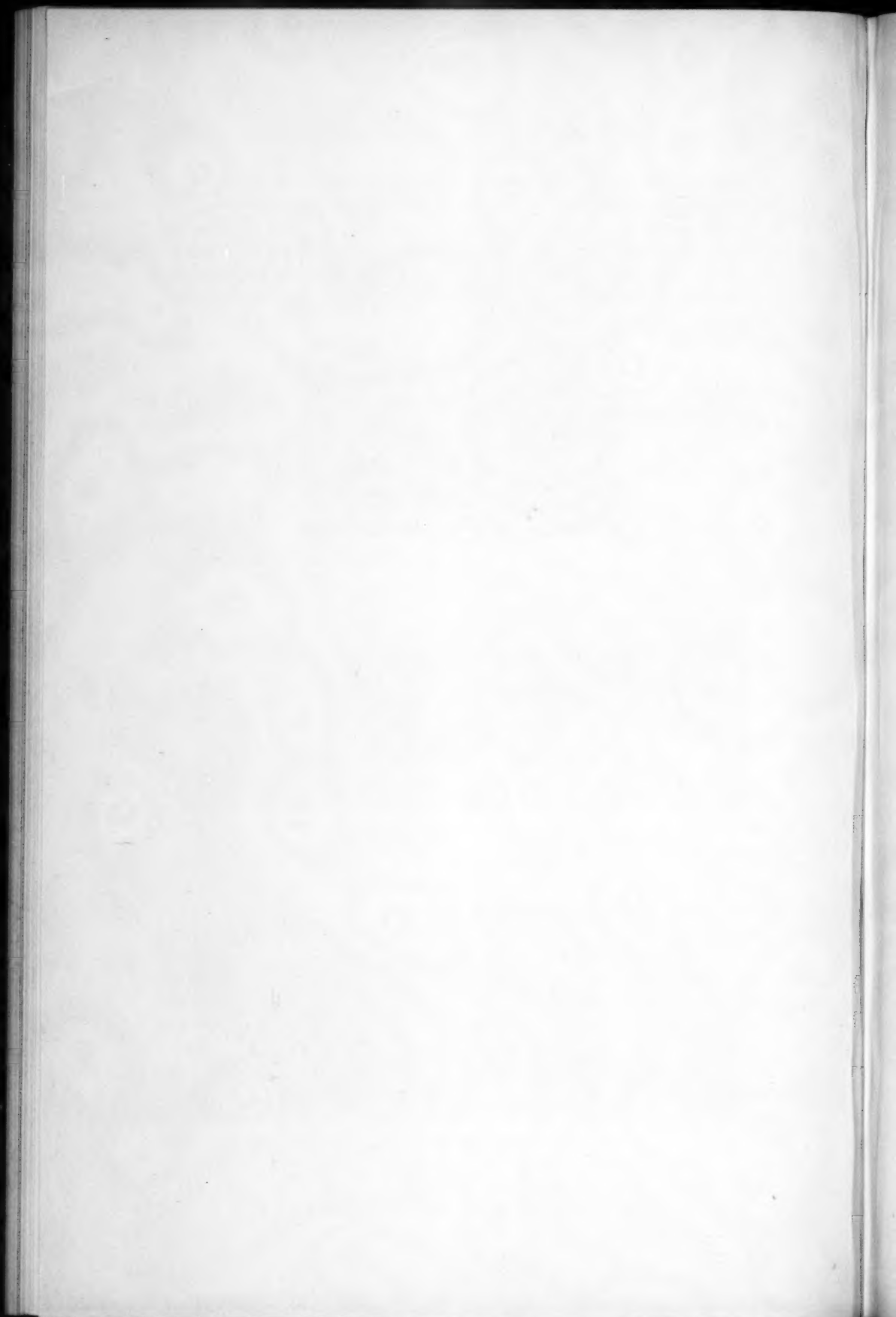


Photos by Broun

VIEWS OF HAWK MOUNTAIN.

1. PROMONTORY FROM WHICH HAWKS ARE OBSERVED; LOOKING EAST-NORTHEAST.
2. CREST OF KITTATINY RIDGE FROM PROMONTORY.
3. VIEW FROM PROMONTORY, SOUTHWARD ACROSS THE KETTLE.





three to four hours at the promontories. His records of 413 birds (nearly all observed up to November 25) have been incorporated in the text. As stated previously, my records covering the first three weeks are incomplete. It is necessary, therefore, to point out that the totals for the Broad-wings, the Sharp-shins, and possibly the Ospreys, are not representative, as no doubt many of these birds passed before I was able to make systematic observations.

TOTAL NUMBER OF HAWKS RECORDED DURING MIGRATION, FALL OF 1934.

1. <i>Cathartes aura septentrionalis</i> . TURKEY VULTURE.....	166
2. <i>Astur a. atricapillus</i> . EASTERN GOSHAWK.....	123
3. <i>Accipiter v. velox</i> . SHARP-SHINNED HAWK.....	1913
4. <i>Accipiter cooperi</i> . COOPER'S HAWK.....	333
5. <i>Buteo b. borealis</i> . EASTERN RED-TAILED HAWK.....	5609
6. <i>Buteo l. lineatus</i> . NORTHERN RED-SHOULDERED HAWK.....	90
7. <i>Buteo p. platypterus</i> . BROAD-WINGED HAWK*.....	2026
8. <i>Buteo lagopus s. johannis</i> . AMERICAN ROUGH-LEGGED HAWK.....	20
9. <i>Aquila chrysaetos canadensis</i> . AMERICAN GOLDEN EAGLE.....	39
10. <i>Haliaeetus l. leucocephalus</i> . BALD EAGLE.....	52
11. <i>Circus hudsonius</i> . MARSH HAWK.....	105
12. <i>Pandion haliaetus carolinensis</i> . OSPREY.....	31
13. <i>Falco rusticolus candicans</i> . WHITE GYRFALCON.....	2
14. <i>Falco rusticolus obsoletus</i> . BLACK GYRFALCON.....	2
15. <i>Falco peregrinus anatum</i> . DUCK HAWK.....	25
16. <i>Falco c. columbarius</i> . PIGEON HAWK.....	19
17. <i>Falco s. sparverius</i> . EASTERN SPARROW HAWK.....	13
Unidentified.....	208
Total.....	10,776

* The actual number of Broad-wings recorded by the author was 526. To this is added the more conservative side of the "1500 to 2000" birds reported on September 17.

Cathartes aura septentrionalis. TURKEY VULTURE.—These birds were seen at frequent intervals from the time of my arrival until November 8, when I recorded a single individual. Kramer reported a lone bird on December 2. At times it was difficult to determine whether they were migrating, or merely loitering in the vicinity. The thirty or more "Buzzards" that occurred in late October and November, however, kept apace with the rapid-flying Red-tails.

Astur a. atricapillus. EASTERN GOSHAWK.—On October 10 Kramer reported seeing four Goshawks. A pronounced movement ensued, with 24 observed on the 11th, 23 on the 12th, 19 on the 13th, 6 on the 14th, and 4 on the 15th. In the same period 330 Sharp-shins and 99 Cooper's Hawks were observed. This migration was attended by rain and snow and rapidly falling temperatures in northern New England. A flight perhaps comparable to this occurred on slightly later dates in 1927. Sutton, in the article already referred to, records 4 Goshawks shot on October 19, and 16 on October 22 of that year. We may imagine the number that passed unharmed.

Notwithstanding their early arrival in unusual numbers, Goshawks afterwards

appeared desultorily and in negligible numbers—14 birds during the rest of October, and 29 during November and up to December 2.

Accipiter v. velox. SHARP-SHINNED HAWK.—This species suffered heavily when "Hawk Mountain" was a shambles. Collins estimated that on many days over 50% of the Sharp-shins were killed. The explanation is found in the birds' manner of flight. They usually skim just above the trees on the crest of the ridge, and when nearing the promontories they suddenly dart upwards, barely touching the rocks.

The migration of these Accipiters is longer and more continuous than that of the other species of Hawks. Beginning with a few straggling birds in late August, according to local reports, the Sharp-shins continued coming until November 19, when two individuals were seen. The flight reaches its peak in mid-October. Record Sharp-shin days came on October 11, with 135 birds; October 18, with 466 birds; and October 23, with 399 birds.

Early in the season I started to keep tabs on the ratio between the sexes, and to differentiate immature birds. Valuable as such data might be, it was almost futile to continue its compilation. The fleeting glimpses of the little Sharp-shins were often unsatisfactory for such determinations, while larger raptorial birds constantly intruded and demanded equally close study. It was my impression, however, that the bulk of Sharp-shins seen previous to October 15 were immatures.

Accipiter cooperi. COOPER'S HAWK.—This species was seldom plentiful, as may be inferred from the total number recorded. If we may judge from Poole's "composite picture," the Cooper's Hawk probably has never been a conspicuous migrant along the Kittatinny Ridge. A few birds were seen almost daily from September 30 to November 19. Exceptional days in the migration of this species, all occurring in October, follow: 42 on the 8th, 36 on the 11th, 34 on the 12th, and 26 on the 23d.

Buteo b. borealis. EASTERN RED-TAILED HAWK.—It may come as something of a surprise to learn that these splendid birds made up fully 50% of the entire Hawk migration. The first Red-tails recorded were two on September 30. No conspicuous movement took place until October 12, when 205 birds were counted. Thereafter during the month there were nine days of relatively heavy flights, the greatest number of 427 birds occurring on October 23. The first part of November, however, brought the major flights, with an average of 244.5 birds per day for 12 days. On November 1 I recorded 592 Red-tails—as many as 213 in a single hour; on November 2, 853 Red-tails. Kramer reported diminishing numbers of Red-tails during the latter part of November, except for 67 on the 24th. He saw 9 on December 2, and 4 on the next day.

These Buteos usually travelled singly, or in pairs. Occasionally during heavy flights groups of seven or eight birds would be seen. On October 31, during the forenoon, a few larger, compact flocks were observed: one of 16 birds, and three each containing 10 to 14 birds.

An attempt was made to ascertain the speed of flight of the Red-tails. Forty miles per hour was the average, when the birds were flying low. The rate of speed increased considerably when the birds were passing well above the promontories.

A puzzling aspect of the Red-tail migration was the decided scarcity of immature birds. Of an aggregate of 3001 birds occurring on fourteen days when it was possible to determine plumage differences easily, 425 or 14.2% were birds-of-the-year. On November 2, when 853 Red-tails were counted, only 85 young birds were seen—a ratio of ten adults to one immature. Of 32 Red-tails killed on October 22, 1927, according to Sutton only three were immature. What becomes of the young Red-tails? Do they follow the coastal route, or the valleys? Perhaps they learn to take

the easier mountain route with its air-currents and well-marked line of travel, after a year or so of experience.

Absolute silence during migration was characteristic of all species excepting the Red-tails. On eleven different occasions I heard the rasping whistle of these Buteos as they flew by the promontories.

Buteo l. lineatus. NORTHERN RED-SHOULDERED HAWK.—Ninety individuals flew by between October 2 and November 18. The greatest number observed in one day was thirteen on November 2.

Buteo p. platypterus. BROAD-WINGED HAWK.—This species has always had a major part in the Hawk migrations along the Kittatinny Ridge, and has suffered particularly at the hands of the gunners here in past years. The Broad-wings arrive in small numbers the latter part of August, making up the vanguard of the Hawk flights. By mid-September, or during the third week, large numbers appear, and thereafter the migration of this species is definitely on the wane. My field notes show the last Broad-wings (12 birds) passing through on October 9, just as the flights of the Red-tails were gaining momentum. Elsewhere in the text (page 237) I have given the data of two noteworthy flights of Broad-wings.

Buteo lagopus s. johannis. AMERICAN ROUGH-LEGGED HAWK.—That the Rough-leg is not prone to journey down mountain routes is evidenced from our negligible total of 20 birds, seen singly as a rule, from October 12 to December 3.

Aquila chrysaetos canadensis. AMERICAN GOLDEN EAGLE.—The occasional appearance of Golden Eagles among the lesser Falconiformes proved to be the most interesting feature of the season, and a revelation to the many persons who were fortunate enough to see some of these magnificent birds. In most cases these eagles favored us with exceptional opportunities for study. They would pass obligingly close to the promontories, and in fact head right for them unless there was some movement on the part of the observers. Once as I sat motionless and partially concealed by a great slab of rock, an adult Golden Eagle came within thirty feet of, and somewhat lower than, my position. On several other occasions I was able to look directly down upon these birds.

In the majority of cases the identifications were made easily. The "golden" color of the hind head was seen on immatures as well as adults. The latter showed more or less gray on their otherwise dark backs, while grayish lesser wing-coverts were quite distinct at all times. Young birds were carefully identified by the conspicuous white areas in their wings, and by the basal white of their tail feathers—both unfailing characteristics. It was also possible to distinguish Eagles approaching in the distance, for the noticeably small heads of the Golden Eagles marked those birds from the huskier-headed, large-billed Bald Eagles.

Golden Eagle No. 323,094, cited with the data on banded Hawks, is a worthy subject for speculation. Banded near Philadelphia in the spring of 1926, the bird was killed just seven months later in the direct line of flight of the southward-bound raptors. Where did this bird spend the intervening months? If Golden Eagles do not breed in the vast wildernesses of eastern Canada, or in the remoter wilds of north-eastern New York, it is barely possible that they drift eastwards across the continent after the breeding season. In the latter category may be placed an adult Golden Eagle which was seen on July 19, 1931, over the Housatonic River, Ashley Falls, Mass., by S. Waldo Bailey, Leonard Sweitzer and the author.

Sutton reports an unusual abundance of Golden Eagles in Pennsylvania during the winter of 1927-28, and cites four records of birds having been killed.¹ An adult

¹ George M. Sutton, *The Auk*, 1928, p. 375.

Golden Eagle, shot by a hunter above Dreherstown, on November 10, 1931, is in the collection of the Reading Public Museum.¹

The data follow for each of the 39 Golden Eagles seen during the season:

Date	No. seen	Age	Time		Seen by others besides the author.
			A.M.	P.M.	
Oct. 7	1	ad.		1	10 members of the Delaware Valley Ornithological Club.
9	1	ad.		3:40	
11	1	im.		3:15	
12	2	both im.		1:15; 3.	Mrs. C. N. Edge and Mrs. Alfred Edey
14	5	all im.		3:30-4:30	Two seen by 30 members of the D. V. O. C.
15	4	all im.	11:15	12-3	Three birds seen during P.M., one by Messrs. B. S. Bowdish and J. Parmely.
16	1	im.	8:45		
18	2	im.		3; 3:50	
22	1	im.		1:40	Mrs. G. G. Fry.
28	2	ads.	11:45	1:30	Both seen by 35 members of the D. V. O. C.
29	1	ad.		12 N.	
30	1	ad.		2:30	
Nov. 8	1	ad.		1:35	
10	1	ad.		1:30	
11	3	ads.	10:05	1:30	R. H. Pough and E. L. Poole.
			11		
12	3	ads.	9:50		
			10:15		
			11:15		
14	1	ad.		12:45	This and the following identified by R. H. Kramer.
15	2	both im.			
18	1	im.			
24	2	im.		12:35; 1:35	
25	1	?	9:10		
Dec. 2	2	?		1:15; 1:30	

The above data bring several questions to mind. Do these birds occur regularly each fall along the Kittatinny Ridge, or is their appearance in numbers this season unprecedented? Whence came these Golden Eagles? Their exact status anywhere in the east is a moot question.

***Haliaeetus l. leucocephalus*.** BALD EAGLE.—This species evidently occurs throughout the greater part of the Hawk migration. I saw four adults on September 14, and one or two birds at rather frequent intervals during October. A noteworthy

¹ Earl L. Poole, *The Auk*, 1932, p. 234.

flight of Bald Eagles was witnessed by Kramer on September 27. He reported seeing 22 individuals, mostly adults, pass over the road about 2 o'clock. Five Eagles of this species were seen in November, the last being recorded on the 24th, by Kramer. The total of 52 Bald Eagles for the season includes at least 20 birds-of-the-year. All but four of the entire number of Bald Eagles flew past in the afternoon, generally between 1 and 3 o'clock.

Circus hudsonius. MARSH HAWK.—Our records of this species extend from September 24 to November 24. The majority of the 105 individuals recorded passed through between October 10 and November 10. The greatest number seen on one day was 11 on October 18, and 11 on November 3. The females precede the males, apparently, as most of the 51 birds that occurred up to October 19 were of the former sex. Of 38 Marsh Hawks observed from November 1 to 12, 28 were males.

Pandion haliaetus carolinensis. OSPREY.—Ospreys sailed down the ridge at infrequent intervals from September 15 to October 11. Ten individuals flew by on October 7, but it was usual to see one or two a day.

Falco rusticolus candicans. WHITE GYRFALCON.—On October 11, shortly after 1 o'clock, Charles French and R. H. Kramer saw a bird which they described as a "pure white Hawk, bigger than a Red-tail, and built like a Falcon." The bird swooped low over the promontory, and between the two observers, coming within a dozen feet of them. I happened to be walking through the woods at the time, and missed the observation.

Late in the afternoon of November 2, the day when 1013 Hawks flew by, I was busy counting Red-tails when suddenly a great white Falcon appeared and passed about one hundred feet below the promontory. This bird, as well as all other Hawks, was studied carefully with Zeiss 8X binoculars.

That the above occurrences of Gyrfalcons in Pennsylvania are by no means unique is attested by the following records of recent years. A dark-colored Gyrfalcon was killed by a farmer on January 7, 1927, near Manheim, Lancaster County (within 20 miles of the Kittatinny Ridge).¹ It was mounted and is in his possession.

A White Gyrfalcon was killed on November 11, 1928, twenty miles northeast of Dreherstown, in the Kittatinny Ridge, by Dr. Samuel B. Kern. This bird is mounted and on exhibition in the Reading Public Museum.²

Falco rusticolus obsoletus. BLACK GYRFALCON.—So far as I know, there are no published records of the occurrence of this race in Pennsylvania. We therefore offer the following sight records with the realization that they must be relegated to the hypothetical list. A Gyrfalcon in very dark plumage was studied on October 12 (a day later than the first White Gyrfalcon noted above) by Mrs. C. N. Edge, Mrs. Alfred Edey and the author. During the brief two minutes that we watched it, the bird dashed round the promontory and just over our heads, occasionally plunging at the passing Sharp-shins and even Red-tails. Again on October 15 I saw a Gyrfalcon, apparently of this race, flying over the ridge and swooping about the promontories. On the following day I had a brief, unsatisfactory view of a large, very dark Falcon which may, however, have been an immature Duck Hawk.

Falco peregrinus anatum. DUCK HAWK.—According to Poole's chart, these Falcons were seldom seen during the migrations. The 25 Duck Hawks on our records occurred on scattered dates between September 30 and November 8. Only five of these were birds-of-the-year.

Falco c. columbarius. PIGEON HAWK.—Seven Pigeon Hawks were seen on

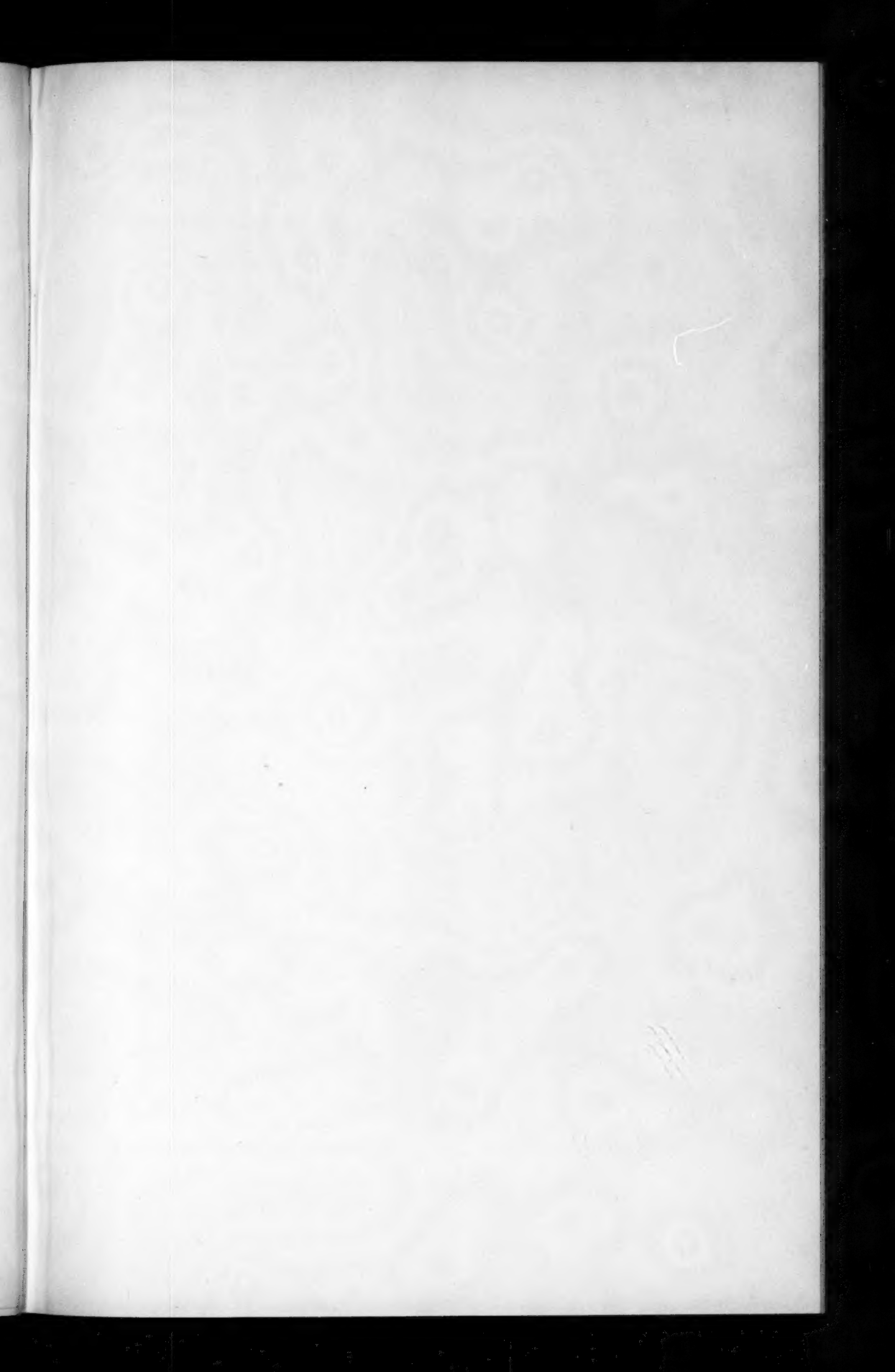
¹ Witmer Stone, *The Auk*, 1927, p. 250.

² Earl L. Poole, *The Auk*, 1933, p. 97.

September 12, the rest in October: 2 on the 7th, 3 on the 8th, 1 on the 10th, and 6 on the 11th.

Falco s. sparverius. EASTERN SPARROW HAWK.—Single birds flew by on the 12th and 25th of September; in October 6 occurred on the 7th, 1 on the 8th, 2 on the 11th, and single birds on the 12th and 20th.

Orleans, Mass.





UPPER: CHOLLAS CACTUS; CAMP IN CENTER OF BACKGROUND
LOWER: GULLS FEEDING ON FISH OFFAL NEAR THE VILLAGE, PUNTA PENASCOSA,
MEXICO.

FEBRUARY BIRD LIFE OF PUNTA PENASCOSA, SONORA,
MEXICO.

BY LAURENCE M. HUEY.

Plates X-XI.

From February 8 to 28, 1934, a party representing the San Diego Society of Natural History, operating under permits from the Mexican Federal Government, maintained a field collecting camp at Punta Peñascosa, on the northwestern coast of Sonora, Mexico. A brief description of the region and an annotated report of the birds follow.

Punta Peñasco is a compact series of low, rugged, broken, black lava hills on the northeastern shore of the Gulf of California at latitude 30° 18' N., and lying between Bahia Adair and Bahia de San Jorge. Immediately behind and parallel to the beach there is an area of sand dunes which varies in width from a few hundred yards to about two miles. These range as far up and down the coast line as we were able to explore or see from the summit of the rocky hills. The adjoining area for five or six miles inland from the dunes is a level, sandy, alkaline region with very sparse vegetation, and not at all conducive to bird life. From a vantage point on the summit of the hills at Punta Peñascosa, "George's Island" is plainly visible to the southward and the high Sierra San Pedro Martir in Lower California can be seen on the other side of the Gulf. Directly across the rather shallow bay towards the northwest a headland of granite hills not unlike those of Punta Peñascosa in shape, called Punta Cholla, stand out in bold prominence, while inland and more northerly "Direction Hill" is seen. Far beyond on clear days the Tinajas Altas range, which lies just east of Yuma, Arizona, is visible. To the north, the Sierra Pinacate with its three-peaked summit, the highest one of which has been named Carnegie Peak, is ever in view. This range was visited by William T. Hornaday and has been graphically described in his book, 'Camp Fires on Desert and Lava.' Almost the entire eastern skyline was bounded by serrated granite mountains, including the Sierra Pinta range, but all were too far away from Punta Peñascosa for exploratory work from our camp. In general, the interior region here described differed physiographically but little from that part of southwestern Arizona which is directly north of the International Boundary—a vast plain with small, jutting, steep, rocky ranges piercing the level surface.

Botanically, however, a vast difference was found. The level condition of the southern region forbade rapid drainage of the no doubt heavy, sporadic, summer storms, and the alkaline content of the soil seems to have accumulated. Hence only salt-tolerant plants were present. Chief amongst

these were Frutilla (*Lycium*), Glasswort (*Salicornia*), and a species of wire-grass (*Spartina*) that grew sparingly nearer the sand dunes. Only two kinds of cacti were found—a rather scarce species on the lava hills that was unknown to me and Bigelow's Cholla (*Opuntia bigelovii*). The latter was found growing in rather dense patches in two or three places where soil conditions permitted and apparently had no bearing on the bird life of the region. The Frutilla was by far the most important of the three plants mentioned and seemed to harbor the majority of the few land birds present. Thus, of eleven resident land birds, seven found either protection or subsistence amid the thickets of this plant.

That the alkaline condition of the soil controlled both plant and bird life of the land area of this region was plainly evident when the more dense desert growth thirty or forty miles inland was observed. Here an abundant desert flora and avifauna were present whose approach to the coast was discouraged chiefly by the saline condition of the soil there. In the more elevated and irregular terrain inland, the storms doubtless dissolved and carried the alkali seaward, permitting a ranker type of vegetable growth to become established and a correspondingly greater avifauna.

It is thus not difficult to see that a very scanty land bird life through such an arid region was to be expected, and a great number of the species recorded or collected were single individuals. This list may well represent a fairly good part of the winter visitants to Punta Peñascosa. While I little doubt that during migration the number of species could be greatly increased, it is hardly conceivable that an abundance of individuals would be found, owing to the scarcity of food and entire lack of water to attract them. Along the shore-line, conditions were much better for the birds that occur in a littoral association. The presence of humans deriving their livelihood from fishing and the consequent refuse offered a bounteous source of food for Gulls, and they were present in multitudinous numbers feasting while the offal was fresh. This same refuse, when drying along the high water mark, attracted myriads of small flies on which several species of shore birds fed. However, but little attempt was made to undertake a complete survey of the water birds and without question many species were missed.

I am indebted to Mr. A. J. van Rossem of the California Institute of Technology of Pasadena for identifying the Horned Larks. To the several courteous Mexican officials who expedited our passage I also wish to express thanks.

1. *Colymbus nigricollis californicus*. EARED GREBE.—When down by the water's edge on the afternoon of February 25, I saw two Eared Grebes at very close range.

2. *Pelecanus occidentalis californicus*. CALIFORNIA BROWN PELICAN.—Common and seen throughout our visit.

3. *Sula brewsteri*. BREWSTER'S BOOBY.—Not uncommon. Usually seen fishing in company with Pelicans and Terns.

4. *Phalacrocorax auritus albociliatus*. FARALLON CORMORANT.—Not uncommon. Seen almost every time the shore-line was visited.

5. *Ardea herodias treganzai*. TREGANZA'S HERON.—A pair of very wild Blue Herons lived along the beach and were seen many times.

6. *Egretta thula brewsteri*. BREWSTER'S SNOWY EGRET.—A single bird of this species frequented the beach and was often seen. At first it seemed very wild, but later became remarkably tame. At one time when I was without even a camera it allowed approach to within 50 feet before it flew.

7. *Casmerodius albus egretta*. AMERICAN EGRET.—On February 8, a single bird of this species was seen flying over the bay.

8. *Anserinae* (sp.?). GEESE.—On the night of February 18 many bands of Geese were heard flying over. The calls of some seemed so close that several times we were out trying to catch sight of them in the dim light of a very faint moon.

9. *Dafila acuta tatzihua*. AMERICAN PINTAIL.—Ducks were few during the first part of our stay. Two male Pintails were closely approached on February 18. Later, great flocks passed up and down from one bay to another with daily regularity. They seemed to come into shore during the night to feed and retreat to the safety of deep water at daybreak.

10. *Nyroca americana*. REDHEAD DUCK.—Not common. A bright headed male was seen in the company of the two Pintails on February 18, and during the last days of our visit a bunch of 14 were living in the bay near the fishing boats.

11. *Nyroca affinis*. LESSER SCAUP DUCK.—On February 25, six Lesser Scaup Ducks joined the bunch of Redheads. A young Mexican official borrowed a gun from us and killed two. Both were preserved as specimens.

12. *Melanitta perspicillata*. SURF SCOTER.—Three were seen early on the morning of February 23.

13. *Mergus serrator*. RED-BREADED MERGANSER.—Seen along the beach in fair numbers. They were pairing off during the latter part of the month.

14. *Cathartes aura teter*. WESTERN TURKEY VULTURE.—Observed soaring about almost daily.

15. *Buteo borealis calurus*. WESTERN RED-TAILED HAWK.—During the afternoon of February 7, while we were en route to Punta Peñascosa, several Red-tails were seen flying over the desert; and during our stay an occasional one was seen in the air.

16. *Aquila chrysaetos canadensis*. GOLDEN EAGLE.—On February 21 a fine adult Golden Eagle soared over camp.

17. *Circus hudsonicus*. MARSH HAWK.—A single Marsh Hawk was observed coursing over the region and was secured on February 21.

18. *Pandion haliaetus carolinensis*. OSPREY.—A lone Osprey inhabited this immediate region and was seen almost every day. When the tide was high his favorite perch was on the top of a boat mast; but when the boats were grounded he took refuge on the tops of the sand dunes. On several occasions he was seen inland perched on dried fish heads that had been dragged from the beach by coyotes.

19. *Falco mexicanus*. PRAIRIE FALCON.—At about 10:30 P. M. on February 7, as we were grinding along through very heavy sand on our way to and not far from Punta Peñascosa, a Prairie Falcon, apparently dazed, fell with considerable impact in the center of the road directly in front of the car. Probably the fact that I had allowed the spot-light to cast its beam obliquely upward had some bearing on this

unexpected occurrence. The bird's line of flight may have crossed this beam, causing it to lose its sense of direction. The Falcon regained its balance and took wing in a remarkably short time, even before one of our party riding on the running board could leap to capture it.

Another Prairie Falcon was seen on February 8, perching on a sand dune near the shore. When it flew it started to harry five Ravens, which were flying in close formation nearby, and seemed to get a great delight out of the Ravens' distress and the distracted cawing of the pursued bird.

20. *Lophortyx gambeli gambeli*. GAMBEL'S QUAIL.—A small covey was flushed from a thicket of Frutilla on February 20. The presence of Quail in the region had been determined by tracks seen several times on tramps in various directions. The fact that Quail were living in limited numbers amid such bleak and waterless surroundings gave rise to considerable speculative conversation regarding this bird's habits.

21. *Charadrius nivosus nivosus*. WESTERN SNOWY PLOVER.—Fairly common along the beach. Most frequently found around the dried fish heads, feeding on flies.

22. *Pagolla wilsonia beldingi*. BELDING'S PLOVER.—On February 16 a flock of 8 Belding's Plovers was found near the water's edge as the tide was receding, from which 3 were taken. Later this Plover was seen in small numbers along the beach. They seemed to frequent the place where the fishermen dumped the offal from their catches and it was found that they were feeding on the small flies which congregated in vast numbers about the rotting fish heads.

23. *Eupoda montana*. MOUNTAIN PLOVER.—On February 19 a bunch of about three dozen individuals was found on a flat sandy area about one mile inland by Philip Lichty, a member of the party, and 2 specimens were taken. This same bunch was seen by the writer on three subsequent days when collecting in the region, but owing to their rarity no more specimens were taken. The Plovers were very tame and could be approached within a few yards before they took wing.

24. *Oxyechus vociferus vociferus*. KILLDEER.—Three Killdeer Plovers stayed about the old dried fish heads, where they feasted on flies.

25. *Squatarola squatarola*. BLACK-BELLIED PLOVER.—A single Black-bellied Plover was seen on February 8 and almost every time thereafter that I visited the beach.

26. *Arenaria interpres morinella*. RUDDY TURNSTONE.—A single individual was seen in the flock of Black Turnstones on February 15.

27. *Arenaria melanocephala*. BLACK TURNSTONE.—A flock of about 20 birds was seen several times along the beach.

28. *Capella delicata*. WILSON'S SNIPE.—A single specimen was collected February 17. The bird seemed out of place when it flushed from the shade of a Frutilla bush on the dry desert two miles from the beach!

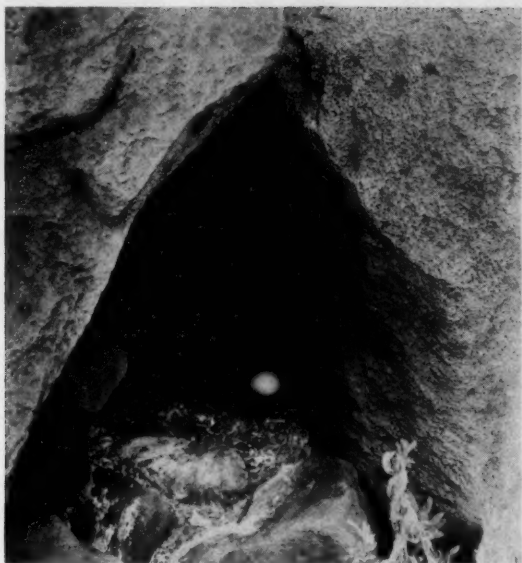
29. *Numenius americanus americanus*. LONG-BILLED CURLEW. A few Long-billed Curlews were to be found along the beach at all times during our stay.

30. *Catoptrophorus semipalmatus inornatus*. WESTERN WILLET.—Like the preceding species, Willets in limited numbers were present throughout our stay.

31. *Pisobia minutilla*. LEAST SANDPIPER.—Found in fairly large flocks along the beach throughout our stay and seemed fond of catching the flies that collected about the dried fish heads.

32. *Ereunetes maurii*. WESTERN SANDPIPER.—Like the Least Sandpiper, was fairly abundant.

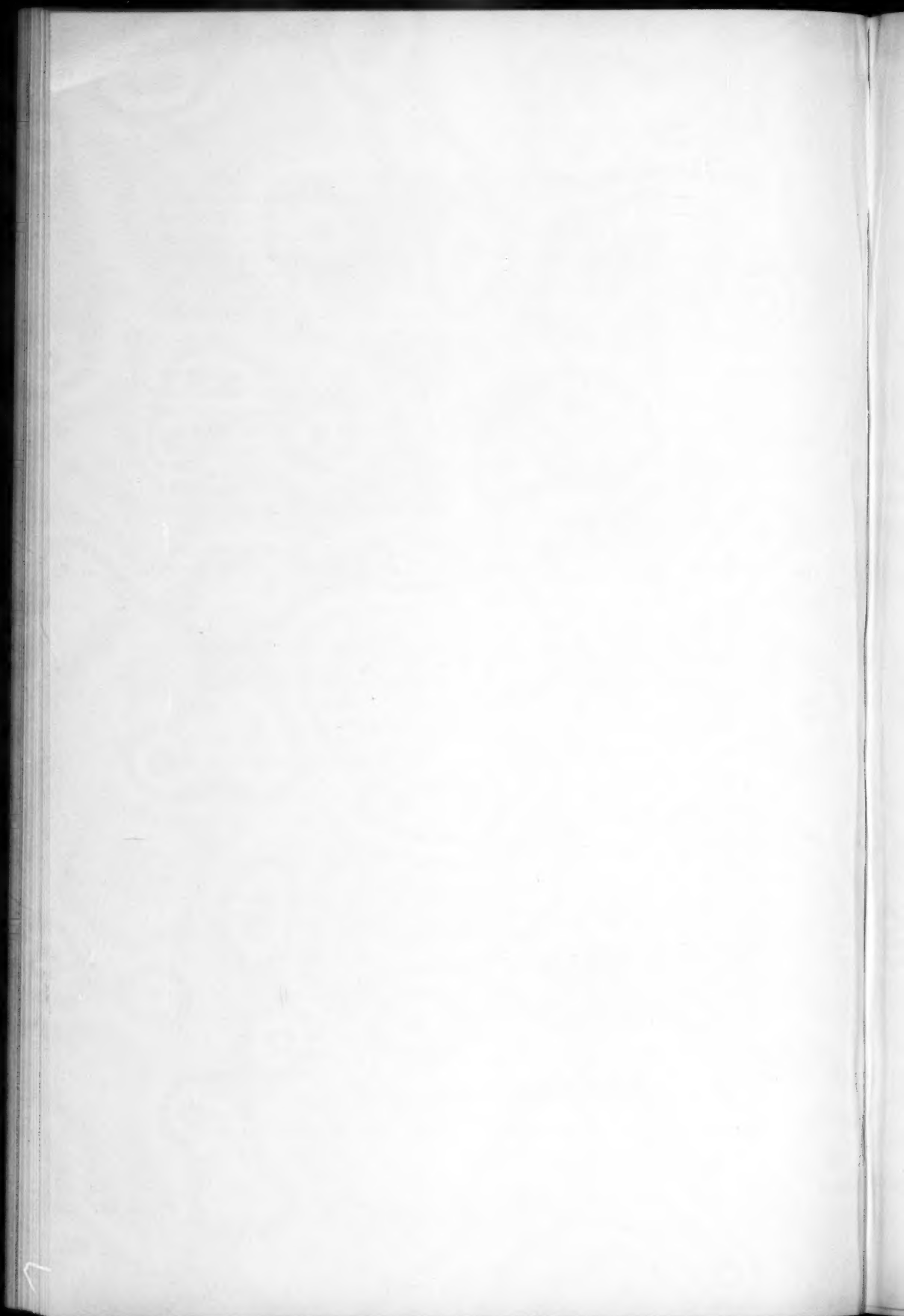
33. *Limosa fedoa*. MARBLED GODWIT.—A few Godwits were present along the beach, but were never numerous.



UPPER: NEST OF WESTERN HORNEO OWL.

LOWER: VIEW FROM SUMMIT OF HILLS AT PUNTA PENASCOSA, LOOKING NORTH;
MT. PINACATE IN THE DISTANCE.





34. *Crocethia alba*. SANDERLING.—A small flock of Sanderlings was often seen with a congregation of other small shore birds along the tide line and likewise had a taste for the flies found about the fish heads.

35. *Larus glaucescens*. GLAUCOUS-WINGED GULL.—Not an uncommon representative in the horde of Gulls attracted by the offal thrown out by the fishermen when they cleaned their daily catch. All of this species were in the immature stages of plumage and not a single adult bird was observed.

36. *Larus occidentalis livens*. YELLOW-FOOTED GULL.—About twenty individuals comprised the population of this resident Gull and they were always present when fish were cleaned.

37. *Larus californicus*. CALIFORNIA GULL.—This was the most abundant Gull present and formed at least 80 per cent of the Gull population of Punta Peñascosa.

38. *Larus delawarensis*. RING-BILLED GULL.—Positive sight identification of Ring-billed Gulls in the various immature plumages is difficult, but the adults were more easily determined. Judging from the proportion of adult Ring-bills compared to adult California Gulls, their numbers were not great.

39. *Larus philadelphia*. BONAPARTE'S GULL.—Observed but once when, after a day of very heavy wind, 3 Bonaparte's Gulls were seen among the host of other Gulls feeding on a school of small fish near shore.

40. *Larus heermanni*. HEERMANN'S GULL.—Never seen scavenging on the beach with the other Gulls, but always sought the schools of small fish for food; and therefore not seen with regularity. About noon on February 14, small fish were running in the bay and approximately 200 Heermann's Gulls came in. After the excitement was over and the Gulls commenced washing themselves and preening their feathers, the Heermann's all bunched up together apart from the large congregation of Pelicans and several other species of Gulls.

41. *Thalasseus maximus maximus*. ROYAL TERN.—This species, like the one following, came in large flocks when the small fish were running, though a few scattered individuals could be seen at any time along the beach.

42. *Thalasseus elegans*. ELEGANT TERN.—Numbers of this beautiful Tern were seen. During the time of our stay they paired off and were fairly well settled by the end of February. It was not uncommon, during the middle of the month, to hear a boisterous clamor of Tern voices high in the air. There a triplet of tiny specks would be discerned, evidently two ardent males seeking the favor of a single female and expressing their opinions of each other.

43. *Bubo virginianus pallascens*. WESTERN HORNED OWL.—On February 18 a Horned Owl's nest containing one egg was found by Philip Lichty. The nest, composed entirely of regurgitated pellets, was situated between two large lava blocks in a slide on the side of a rocky hill back of the village. On revisiting this nest on February 26, the egg was found in the position in which it had been left eight days previously. It was cold and had no doubt been deserted. Further search over the rocky hills disclosed several roosting sites amongst the slides of large lava blocks. A notable feature of five of these roosts was that at each one a large boulder, that stood out prominently and offered the best vantage point, was almost completely white-washed with excrement. These were undoubtedly resting places for the Owls as there were no other elevated situations where they could alight to eat or digest their prey. Scattered below these roosts were large numbers of regurgitated pellets, some of which contained beetle, scorpion and mammal remains. Several dozen pellets were collected and have been sent to the U. S. Biological Survey for analysis. Two Horned Owls were flushed from one of these roosts, but were too far away for

an effective shot. Judging from the amount of excrement and pellets of all ages found, this pair of Owls must be permanent residents in the locality.

44. *Calypste anna*. ANNA'S HUMMINGBIRD.—A single specimen was taken February 21.

45. *Megaceryle alcyon caurina*. WESTERN BELTED KINGFISHER.—A single Kingfisher was occasionally seen along the shore and over the small tidal marsh at high tide. This bird was very wild at all times and its presence was often revealed only by its rattling call as it flew away.

46. *Colaptes* (sp. ?). FLICKER.—This species is listed on the basis of heavy wing and tail feathers in the sand dunes, where the bird had no doubt fallen prey to a Prairie Falcon. The feather shafts were of the coral-red color and probably belonged to *C. cafer collaris*; but there is a slight possibility of the victim having been an aberrant *C. chrysoides mearnsi* such as occurs along the Colorado River.

47. *Sayornis nigricans nigricans*. BLACK PHOEBE.—On February 17 two Black Phoebes were collected near the beach. They were feeding on flies congregated about the decaying fish heads and were the only birds of this species seen during our stay.

48. *Sayornis saya saya*. SAY'S PHOEBE.—Two or three very wild Say's Phoebes lived about the village. A single specimen was shot at long range.

49. *Otocoris alpestris leucolaema*. DESERT HORNED LARK.—Several fair-sized flocks and scattered pairs of Horned Larks lived on the flat region east of the tidal flat. Twenty-nine specimens were collected, two of which belonged to this form. Without question most of these birds were winter visitants, and had more specimens been collected other forms would have been found present.

50. *Otocoris alpestris ammophila*. MOHAVE HORNED LARK.—Nine specimens of the series mentioned above belonged to this race, recording its most southern winter occurrence to date.

51. *Otocoris alpestris leucansiptila*. YUMA HORNED LARK.—By far the most interesting part of the series of Horned Larks belonged to this form. The taking of these birds substantiates Grinnell's suspicions (Univ. Calif. Publ. Zool., Vol. 32, No. 1, p. 146) that the race *pallida* or *dwighti* (= *pallida*) is in reality *leucansiptila*. The series taken by me was collected but a few miles from the type locality of "*pallida*" and the birds are not separable from specimens of *leucansiptila* from Yuma and Imperial Valley points. Especial effort was made, when collecting the series, to obtain resident birds. Some of those taken were in pairs and their sexual organs were enlarged; so while too early in the season for nests, there is but little doubt that they were on their nesting ground.

52. *Iridoprocne bicolor*. TREE SWALLOW.—A few scattered Tree Swallows were first seen on February 12 and irregularly afterwards. On February 27 Philip Lichty brought in the only specimen that was taken.

53. *Corvus corax sinuatus*. WESTERN RAVEN.—Five Ravens lived along the beach near the village. They were always extremely wild and were harassed severely by a Prairie Falcon on February 8. Perhaps it was the occasional persecution by the visiting Falcons that made them wary.

54. *Auriparus flaviceps acaciæ*. ARIZONA VERDIN.—It is known that the Verdin keeps a nest repaired at all times for night shelter. Oddly enough, in spite of the finding of a dozen or more nests, in good repair, of this supposedly resident bird, no individuals were seen. Their absence must have been caused by a temporary food shortage.

55. *Heleodytes brunneicapillus couesi*. NORTHERN CACTUS WREN.—Paucity

of the type of flora necessary for Cactus Wrens' existence almost excluded them from this region. The single bird taken and only one encountered might well have been a straggler, wandering westward from the desert growth which grew in profusion twenty or thirty miles inland.

56. *Salpinctes obsoletus obsoletus*. ROCK WREN.—Rock Wrens were found about the hills near camp and were occasionally seen searching among the loose stone walls of the village houses for food.

57. *Mimus polyglottus leucopterus*. WESTERN MOCKINGBIRD.—The only bird of this species recorded was seen February 27 on a rocky hillside near the village.

58. *Toxostoma curvirostre palmeri*. PALMER'S THRASHER.—At least two pairs of Palmer's Thrashers lived within our collecting radius. Although they were seen occasionally they proved exceptionally wild and only two chances to collect a bird were offered. A single specimen was taken.

59. *Toxostoma lecontei lecontei*. LECONTE'S THRASHER.—This desert loving species was the most common resident bird and several specimens were taken. An incubating female was shot by Philip Lichty on February 19. When we returned the next morning to the locality, the nest was found in a Frutilla bush. The male bird was found sitting on the clutch of three heavily incubated eggs.

60. *Oreoscoptes montanus*. SAGE THRASHER.—Sage Thrashers were fairly common and were seen feeding about the village and in the open desert areas. An individual which stayed about our camp became very tame and gleaned crumbs from beneath our table every day. On February 18 about 7:30 A. M. this tame Thrasher found its reflection in the windshield of a truck parked nearby and fought it for over three-quarters of an hour. Standing on the top of the hood about a foot from the windshield the bird would rush violently at its reflection in the dust-covered glass and strike with both beak and feet. Thwarted in its attempt to reach its rival, the bird would back off again and from about the same position feint and parry a moment, rooster fashion, as though it were eyeing its opponent to catch it off guard. This was done when rest was much needed. At other times a violent attack was followed by a hopping and pecking encounter without leaving the glass. Once when the bird was almost exhausted it pecked and pecked at the reflection from a sitting position, resting on its breast and occasionally using its wings to balance itself. Twice, when in an extremely exhausted condition, it slid off the hood on to the running-board with a thump, being too weakened by its vigorous onset to break either of these falls with its wings. Each time, after a short rest, it would get up and fight some more. Once I saw the bird hop down and quench its thirst from a small pool of water that had collected on the ground from melting ice in the truck. By 8:30 the light had changed to such an extent that the reflection was but barely discernible and the then exhausted bird left the scene of battle. Although this Thrasher was present throughout our stay, this was the only time I saw it shadow-boxing. An explanation may be that the truck was moved several times and not always placed in the same position when returned. It seemed to me, however, that the bird discovered its reflection on this particular morning, and after an experience of almost complete exhaustion thought better of repeating the ordeal.

61. *Polioptila caerulea amoenissima*. WESTERN GNATCATCHER.—Western Gnatcatchers winter in the lower desert regions and a single specimen was taken on February 19.

62. *Polioptila melanura lucida*. ARIZONA BLACK-TAILED GNATCATCHER.—This resident species was found sparingly through the Frutilla thickets and three specimens were collected.

63. *Lanius ludovicianus sonoriensis*. WHITE-RUMPED SHRIKE.—A pair of Shrikes lived back of the sand dunes north of the village and were observed almost every day. So extremely wild were they that it was not until February 21 that a bird was secured.

64. *Lanius ludovicianus gambeli*. CALIFORNIA SHRIKE.—A single specimen of this form was taken on February 21. This bird is known to winter sparingly in western Sonora.

65. *Vermivora celata lutescens*. LUTESCENT WARBLER.—Small greenish Warblers were seen occasionally through the Frutilla thickets. Two specimens collected were both of this form.

66. *Dendroica auduboni auduboni*. AUDUBON'S WARBLER.—A single individual of this species was seen near the village during the afternoon of February 14 and was the only one noted.

67. *Sturnella neglecta*. WESTERN MEADOWLARK.—The small tidal marsh of about ten acres was the home of several Meadowlarks. Three specimens taken were all of the above species.

68. *Calamospiza melanocorys*. LARK BUNTING.—On February 19 a flock of about 25 Lark Buntings was found on the desert two miles inland. They were first seen perched in a compact group on the top of a small Frutilla bush. Their dark bodies amid the pale desert soil and shrubs made them extremely conspicuous from a rather long distance.

69. *Passerculus sandwichensis alaudinus*. WESTERN SAVANNAH SPARROW.—An occasional Savannah Sparrow was seen along the shore-line and amid the sand dunes back of the beach. Two specimens collected are both referable to the above race.

70. *Passerculus sandwichensis rostratus*. LARGE-BILLED MARSH SPARROW.—These Sparrows were fairly common near the shore where the fish heads had been dumped, and about the village where it bordered the beach. No evidence of breeding was seen when the few specimens collected were dissected.

71. *Amphispiza nevadensis nevadensis*. NORTHERN SAGE SPARROW.—Sage Sparrows were fairly common in small, loose flocks over the dry, sparsely shrubbed areas.

72. *Spizella passerina arizonae*. WESTERN CHIPPING SPARROW.—Seen but once when, on February 19, a small flock of ten or twelve was found out on the desert. A single specimen was shot but was too badly mutilated to save.

73. *Spizella breweri*. BREWER'S SPARROW.—These small Sparrows were not uncommon on the desert and were sometimes seen in company with a few scattered Sage Sparrows.

74. *Zonotrichia leucophrys gambeli*. GAMBEL'S SPARROW.—A small number of Gambel's Sparrows were present during the entire stay.

75. *Melospiza lincolni lincolni*. LINCOLN'S SPARROW.—A bird of this species was taken on the edge of the tidal marsh on February 17 and was the only record made during our stay.

San Diego Society of Natural History, Balboa Park, San Diego, California.

HELPERS AT THE NEST.

BY ALEXANDER F. SKUTCH.

Plate XII.

IN THE great majority of bird species whose nesting has been carefully studied, each pair build their nest and rear their offspring without help from others of their kind. This, indeed, is almost a corollary of the theory of Territory, which teaches that each breeding pair occupy a definite nesting area from which they vigorously expel other individuals of their own species. While the concept of territory in bird life has done much to stimulate and give definite direction to bird study, as so often happens in the first enthusiasm of working out the details suggested by a fertile scientific theory, it has resulted in a tendency to neglect the opposite side of the story. There are many species in which the mated pair are not so exclusive in their territory, and as a result of this, coupled with other peculiar circumstances, receive more or less assistance in the duties of the nest. The number of recorded cases of helpers at the nest which have come to my notice is relatively small, but this appears to be, at least in part, because their discovery requires a more concentrated attention than is commonly devoted to studies of nesting birds. The relatively few species which are known to have helpers at the nest are scattered among the families and orders of birds in a manner which suggests that the custom of giving and receiving aid in the rearing of a family is not restricted to a few unusual groups, but is of widespread if sporadic occurrence.

It is not my intention at the present time to attempt an exhaustive survey of the cases of birds helping at others' nests which have been recorded in the literature, but rather to relate briefly certain instances which I have personally observed. But I am not aware that anyone has classified the various degrees of outside assistance which the mated pair may receive in their breeding operations, and before proceeding to particular cases I should like to attempt such a classification, the better to understand where my own examples fall.

Assistants may be classified as: I, Juvenile Helpers; II, Unmated Helpers; III, Mutual Helpers. These groups, in the order named, represent an increasing degree of sociability during the breeding season.

Juvenile Helpers. In some species the young of the first brood are still unable to shift for themselves and are dependent upon the care of their father while the mother incubates her second set of eggs. Sometimes, in species of which the male takes no part in the duties of the nest, the mother may feed her offspring of the first brood during the intervals of warming

her second set of eggs. In the mountains of Guatemala I once watched a female White-eared Hummingbird (*Hylocharis leucotis*) who fed her full-fledged offspring, himself already able to poise before the blossoms, during her recesses from her second nest of the season, in which incubation was in progress. Sometimes, when the young of the first brood can forage for themselves before preparations for the season's second nesting have been completed, the adults prefer to be alone during this period. In the valley of the Rio Motagua I watched a pair of Lichtenstein's Orioles (*Icterus gularis*) drive their full-fledged children of the first brood away from the new nest which the female was engaged in building. In such cases as this it is not likely that the young birds will assist in the care of the later brood. But other species tolerate the presence of their young, after they have become self-supporting, in the vicinity of a later nest. They are more sociable than the Lichtenstein's Orioles, and are often rewarded by receiving the youngsters' aid in the care of subsequent broods of the same season.

Lord Grey¹ gives an attractive picture of the family life of the British Moorhen, a close relative of the Florida Gallinule of America. A family came to enjoy the bread crumbs which he threw to them at Fallodon. The parents picked up the crumbs and passed them to their offspring of the first brood, born in May, and these in turn placed them in the bills of their tiny, downy younger brothers and sisters, hatched in July. There seems to have been more formality than intelligent coöperation in the actions of these birds, but at least the desire to help was there. Those who have read Mills'² 'Love Song of Little Blue' may recall that the young Mountain Bluebirds, raised about his cabin in the Rockies, helped the parents satisfy the hunger of their younger brothers and sisters of the second brood. Young Western Bluebirds,³ and Barn Swallows⁴ recently from the nest, have been seen to aid their parents in the care of later broods during the same season. In Honduras I watched a young Groove-billed Ani (*Crotophaga sulcirostris*), slightly over two months old, take a part almost equal to that of his parents in feeding and protecting the latter's younger family. The records of juvenile helpers which I have come upon are not numerous, but from the scattered position of these species among the families of birds, I suspect that the habit is far from uncommon.

Unmated Helpers. Juvenile helpers are of course unmated, but they form a very distinct and easily recognized class, and I prefer to limit the term "Unmated Helpers" to assistants born during the previous nesting season. They may be young birds, outwardly mature but sexually still immature; or sexually mature individuals who, because of the excess of one sex, or from

¹ Viscount Grey of Fallodon, *The Charm of Birds*. 1927.

² Mills, Enos A., *Bird Memories of the Rockies*. 1931.

³ Finley, W. L., *American Birds*. 1907.

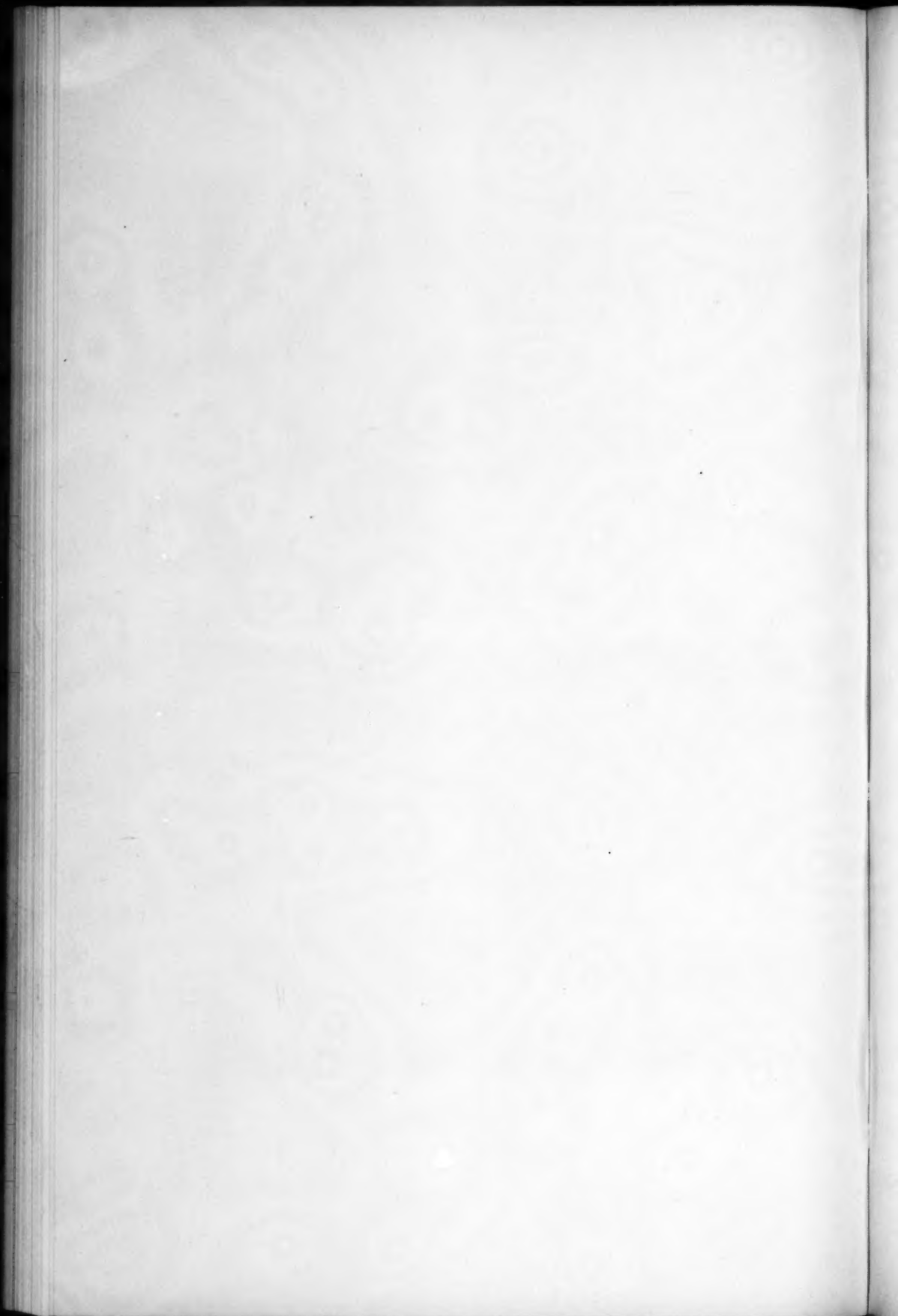
⁴ Forbush, E. H., *Birds of Massachusetts III*. 1929.



LEFT: NEST OF BLACK-EARED BUSH-TIT WITH FOUR MALE NESTLINGS POSED ON OUTSIDE (THEY DO NOT NATURALLY ASSUME THIS POSITION). MAY 23, 1933.

RIGHT: NEST OF BANDED CACTUS WREN. JUNE 14, 1933. BOTH AT TECPAN GUATEMALA.





other causes, can not find proper mates; or individuals old enough to breed who from accident or disease are sterile. Since in individual cases it is not always possible to decide why a particular bird is unmated during the breeding season, it seems best to include in this class all helpers of approximately a year or more of age. In three species which I have watched, the presence of unmated helpers at the nest seems to be the rule.

Among the Brown Jays (*Psilorhinus mexicanus*) the helpers are largely if not entirely yearling birds, still presumably sexually immature. The status of the helpers among the Banded Cactus Wrens (*Heleodytes zonatus*) is difficult to determine; they are at least a year old, and in appearance indistinguishable from the breeding birds. Among the Black-eared Bush-Tits (*Psaltiriparus melanotis*) there is, in certain regions at least, a great excess of males who, not being able to secure mates, help care for the nestlings of other birds. A numerical excess of females seems more likely to give rise to polygamy than to produce helpers at the nests of other pairs. So among Red-winged Blackbirds and Meadowlarks, which normally appear to be monogamous, the occasional presence of an excess of females may result in polygamy. Among species in which the females are normally greatly in the majority, as with Oropéndolas (*Gymnostinops montezuma* and *Zarhynchus wagleri*) and Great-tailed Grackles (*Cassidix mexicanus mexicanus*), polygamy seems to be the rule.

Mutual Helpers. Mutual helpers are breeding birds which coöperate and assist each other in the care of their respective families. Among them we find all degrees of coöperation from casual assistance in repelling a common enemy to the complete sharing of all the duties of the nest. Probably all birds which nest in colonies unite to drive away a Hawk or any other undesirable intruder. Indeed, such service in a common cause is not restricted to members of the same species, for birds of different species will often combine forces in repelling an unwelcome stranger from the neighborhood of their nests. With Oropéndolas and Great-tailed Grackles the situation is a little more advanced, for the males of the colony, who do nothing to help the females directly at their nests, constitute a standing guard, ever ready to give the alarm on the event of danger, and to drive undesirable visitors from the colony. In this last duty the *clarineros*, as the male Grackles are called, are far more active and courageous than the larger male Montezuma Oropéndolas.

Birds which build apartment nests, such as the Green Parrakeet (*Bolborhynchus monachus*) of Argentina and the Sociable Weaver-bird (*Philetarus socialis*) of Africa, show a still higher degree of sociability and group coöperation during the breeding season. Among other species a number of adults take a common interest in the young. The Emperor Penguins (*Aptenodytes forsteri*) undertake in common the task of keeping warm the downy young,

hatched during the tremendous cold of the Antarctic winter, and are said to be so eager for the possession of the little birds that the members of a colony engage in desperate struggles to obtain them, and in these engagements the chicks are frequently injured or even killed by their would-be benefactors. The Adelie Penguins (*Pygoscelis adeliae*) incubate their eggs and attend their nestlings in the normal manner (that is, by pairs); but as the youngsters grow older and require more food, satisfying their needs becomes a difficult problem, for the nesting area is often at a considerable distance from the sea, whence comes all food in the inhospitable Antarctic, and the parents must be gone long hours while they laboriously walk back and forth from the water's edge. In order to release more of their time for the important foraging expeditions, the young, when they can leave the nest, are led to nurseries where a few parents can stand guard over the children of many families, while the rest busy themselves in filling the many hungry mouths. Unmated male Adelie Penguins are an actual menace to the youngsters, and must be driven away from the nurseries by the parents.¹ In the social problem of how to keep idle, unmated birds out of mischief, passerine species like the Brown Jay and the Bush-tit have made great advances over the primitive Penguins.

Complete coöperation or communism, involving all stages of the nesting cycle from the building of the nest to the care of the young, is best exemplified by the Anis. The Groove-billed Ani (*Crotophaga sulcirostris*), which I have watched in Honduras and Guatemala, actually pair at the beginning of the breeding season. The pair may build their own nest and rear their own offspring in the manner of most birds, or two or three pairs may join in the construction of a common nest, in which the eggs, generally four to each female, are laid side by side. Then all the parents, both male and female, take turns in warming the eggs, and later all join in feeding the nestlings. Since I hope later to present a fuller account of the home life of these interesting birds, I shall not at present take space for fuller details.

Helpers at the nest, it may be noted in passing, are not always of the same species as the owners of the nest, and are not always wanted. Forbush records the case of a male Bluebird who busied himself feeding the nestlings of a pair of House Wrens, much to the distress of the latter, until his mate hatched out his own offspring. He also tells of a male Scarlet Tanager who helped feed a nestful of young Chipping Sparrows while his mate incubated. Robins, both the European and the American species, are often ready to place a morsel into the open mouth of any helpless young bird they encounter, not necessarily of their own kind.

With this hasty glance over the field by way of introduction, we may proceed to the more particular object of the present paper, the discussion

¹ Levick, G. Murray, *Antarctic Penguins*, London, 1914.

of certain interesting cases of coöperation which I have had the good fortune to observe in Central America.

THE CENTRAL AMERICAN BROWN JAY

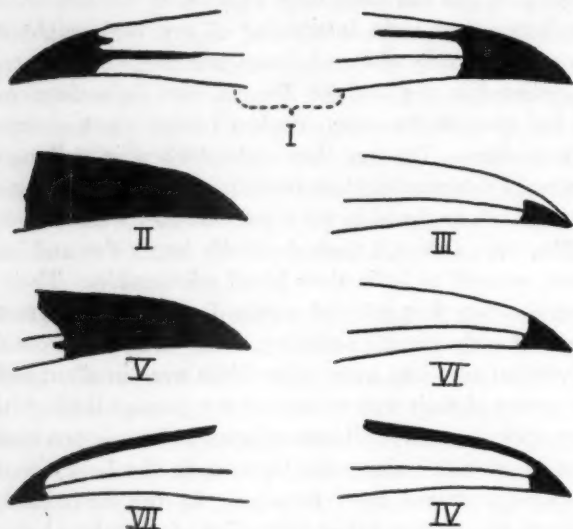
Psilorhinus mexicanus cyanogenys Sharpe.

Two years ago I lived on a banana plantation among the foothills of the Sierra de Merendón, on border territory then claimed by both Guatemala and Honduras, which formed a sort of independent buffer province between the two republics, but has since been awarded to the former. Among the most conspicuous and most interesting of my bird neighbors were the Brown Jays. The family of Jays belongs primarily to cooler regions and is poorly represented in the lowland Tropics, but these dwellers in the hot lands had lost none of the noisy, restless habits which characterize their relatives everywhere. The way they scolded when, in walking through the banana groves, I interrupted their feasts upon the rich nectar of the white banana flowers, left no doubt in my mind that they were near cousins of the northern Blue Jay, although their decidedly larger size and brown, white-vested dress, seemed to belie their blood relationship. Their harsh cries were among the very first notes of purely diurnal birds to greet my ears in the dim light of early dawn; at midday, when all nature drowsed under the rays of a vertical sun, and most other birds were in silent seclusion, they seemed to go out of their way to protest my passage through their haunts. Their lively flocks foraged in all sorts of open and semi-open country; among the banana plantations; along the lagoons; in the bushy pastures of the foothills, where scattered trees remained; in the inextricably entangled second growth which soon takes possession of abandoned clearings of all kinds; but I never met with them in heavy forest.

The Brown Jays possessed one peculiarity which convinced me would make them particularly interesting to watch. Their bills, feet and bare rings surrounding the eyes were not all of the same color, as is the case with most birds, but were so variously marked with yellow and black that it seemed that I should be able to recognize individuals—and the difficulty of recognizing individuals, among other species, is one of the chief handicaps which face the serious bird-watcher. I devoted most attention to the bills, which proved to afford the best recognition marks. Some of the Jays, at the beginning of the breeding season, had bills which were entirely bright yellow; the bills of others, perhaps the majority, were tipped or streaked with black, but hardly two were pied in exactly the same manner. Still other bills were uniformly black. Later I learned that the nestlings' bills, feet and orbital rings are uniformly yellow, and that they turn black with age in an irregular fashion, apparently taking two years or more to become entirely

black. Most of the pied-bills which I found at the beginning of the nesting season were probably yearling birds. On breeding birds the parts in question are often entirely black, but the only generalization which it is possible to make is that with breeding individuals these parts *average* far blacker than with the non-breeding birds who help them.

The Brown Jays placed their nests in the crown of a banana plant, just above the ripening bunch of fruit, or else in trees standing in the open or amid the second growth. The former I could reach by lashing together bamboo poles to form a ladder sixteen or eighteen feet long, the latter were



BILLS OF BROWN JAYS

White areas in the cut were yellow on the bills. I, shows both sides of the bill of the female; an unusual case of variation. II, is the male, evidently her mate. III-VII are bills of the five helpers; IV and VII, so similar that they were taken for the same bird until seen together. (From field sketches, Alsacia Plantation, near Los Amates, Dept. of Izabal, Guatemala, June, 1932).

usually so high, and near the ends of such long, slender branches, that prudence suggested they be left alone. One, in a willow tree beside a lagoon, was against the trunk and could be reached by a hot climb. The nest is a bulky pile of coarse sticks, many of them thorny, which forms the foundation for a shallow cup, neatly constructed of fibrous roots, where repose usually three blue-gray eggs, thickly covered with fine brown speckles. Nesting began in February, but the height of the breeding season was from March to May, while the last nestlings took wing in June.

Male and female share in the construction of the nest. Early in April I watched a pair building a nest high up in a wild fig tree which stood in a

hedgerow between two banana plantations. Although both sexes took part in the task, they were unable to coöperate closely, and one, after adding a stick or a root, would sit in the unfinished structure for several minutes and call in a loud, complaining voice, as though berating the negligent mate. As is often the case with mated birds, the bills of both were entirely black and I could not distinguish them, but from the behavior of other pairs, of which one member had some yellow on the bill, that I watched later, I strongly suspect that the noisier of the two was the female. When a pied-billed bird, probably a yearling, alighted on the nest and seemed interested in it, the black-bills did not take offense and drive it away, as other kinds of birds resent the presence of any intruder in the vicinity of their nests. This fact alone promised to have interesting consequences. Later, on a single occasion, I saw a young pied-bill bring a stick to a nest which a mated pair were building.

As the season advanced, I discovered more of the domestic economy of the Jays. Like the female American Goldfinch, the female Brown Jay alone warms the eggs, while the male at intervals brings her food. Like the Goldfinch, too, she calls when she is hungry, but in place of the former's melodious little tinkle she utters a loud, far-carrying, unmusical *pee-ah*, which seems a complaint at being neglected. Once I had learned to recognize this hunger call, it led me to nests a quarter of a mile away, and I had no lack of Brown Jay families to watch. After sitting continuously for an hour, or sometimes as many as four, the female flies off when she has taken the food her mate has brought her, and he remains standing like a sentinel upon the rim of the nest, or on an adjacent branch, guarding the eggs but almost never warming them. Here he awaits until, after a recess of ten or fifteen minutes, during which she has managed to gulp down more food than he has brought her all morning, she returns to settle once more upon her treasures.

One morning in April, while walking along a sharp ridge among the foothills, I discovered a Jay's nest in the top of a small tree projecting above the vine-smothered second growth which covered the steep slope below me. The female was sitting, and even while I paused looking down at her a bird whose bright yellow bill was only tipped with black flew up, protested my presence rather mildly for a Brown Jay, then perched on the rim of the nest and gave her a morsel of food. A few minutes later the yellow-bill brought another offering to the bird on the nest. Still, I doubted greatly whether a Jay with so little black on his bill could be mated, and resolved to await further developments. I seated myself in a grassy clearing near the summit of the slope, whence I could look down over the tops of the vine-entangled bushes, and although I was in full sight, only fifty feet away, my presence seemed to make little difference in the activities of the birds. They have

not yet had so many sad experiences with man as have their kin in more densely settled countries.

I had waited nearly an hour before a black-billed Jay appeared. Although there was nothing visible in his bill, his throat was outswollen with the food he carried to the nest. After delivering it he went away, but before long he returned with another offering. At his approach this time the female cried out, rose from the nest to greet him, took the proffered morsel and flew off with it, leaving him standing on a twig beside the nest. Here he remained on guard until the female silently returned, after a quarter of an hour's absence, when he flew silently away. Then I felt convinced that this was the mate of the sitting bird, for the yellow-bill never remained on guard. Later it developed that at least two young birds were bringing food to this female, as much, if not more, than her mate.

After the eggs hatched the parents and helpers left the tender nestlings unguarded while they foraged, with the result that some enemy found them in their exposed position and made an end of them. Then the parents tore apart the ill-fated nest and used its materials in the construction of another a few hundred feet away. In due course the eggs were laid and hatched, and the interesting work of attending the three nestlings began. I erected an umbrella blind for concealment, at a point on the precipitous hillside where I was on a level with the nest in the tree down the slope, and spent hours in its shelter, making a sketch of the bill of every bird who brought food to the nestlings. The father's bill had only a small patch of yellow at the base, the mother's bill was more than half yellow, the bills of the helpers varied from yellow slightly tipped with black to black with a little yellow at the base. When I had spent nearly twelve hours in the blind, and thought I could recognize all six of the birds whose bills I had sketched, no matter which side was turned toward me, two Jays with almost identical markings brought food to the nest, then remained standing side by side on its rim, and I knew there were seven (see figs. p. 262).

The parents and their five helpers continued to attend the young at least until, at the age of twenty-three or twenty-four days, they flew from the nest. While the nestlings were still small and unfeathered they were guarded almost constantly, for each of the attendants, upon delivering the food it had brought, remained standing upon the rim of the nest until another arrived to take its place. The mother alone brooded her offspring, but sometimes, when the sun shone directly into the nest, the helpers stood over it in such a fashion as to shield its tender occupants. At times, when a bird flew up with a bill-ful of food, the Jay standing guard would ask for it in a pleading voice, or possibly even try forcibly to snatch it from the new arrival, and if successful in obtaining a portion of the bounty would pass it to one of the little birds in the nest. This was very much like the behavior

of Lord Grey's Moorhens, except that sometimes a parent intermediated between a helper and the nestlings, sometimes a helper took food from a parent and put it in the gaping mouth of a nestling. Rarely a bird abused the privilege of delivering food another had brought, and carried it off for his personal consumption. The helper who most often did this was one of the most faithful attendants, so I felt inclined to forgive him his misconduct. Once, too, he saved one of the nestlings a choking by flying off in this manner with a particle plainly too large, which another bird had brought.

At every one of the five Brown Jay's nests that I watched, I found at least one helper. The nest in the willow tree had three; two aided the parents at a nest in a West Indian birch, growing among the giant canes on a stony flood plain of the Rio Morjá. At the willow tree nest one of the helpers was far more zealous than the parents in defending the young. When I climbed up to look in at them, this pied-bill ventured within a yard of my head, calling excitedly, and finally, lacking the courage to administer the punishment I seemed to deserve, alighted on one of the huge leaves of a nearby banana plant and ripped it into shreds as a substitute. These helpers seem in most cases to be yearling birds who will not have nests of their own until they are two years old. Often, no doubt, they are last year's children of the mated pair in whose duties they assist, but this is not always the case, especially where there are five helpers, for Brown Jays as a rule raise no more than three fledglings each year.

THE BLACK-EARED BUSH-TIT.

Psaltiriparus melanotis melanotis (Hartlaub).

The following nesting season found me in the high mountains of Guatemala, only two hundred miles distant from the plantation where I had watched the Jays, a trifle farther to the south, but climatically and biologically in another zone. Here, between eight and nine thousand feet above the sea, where the dawn which follows a clear night from November to April reveals the fields white with frost, the forests are of oaks, pine and alder, the latter not a bush, as in the north, but a tall tree. Here grow violets, buttercups, and the same self-heal we know at home, but as proof that we are well within the Tropics there are begonias, fuchsias which form small trees, and epiphytic orchids which burden the branches of the oak trees. The birds are in part such as one might expect to find among oaks and pines: Bluebirds, Whip-poor-wills, Flickers, Hairy Woodpeckers, Towhees and Blue Jays, living on intimate terms with such distinctly tropical forms as Woodhewers, Trogons, Toucans and Motmots.

There is one bird which seems to belong among oaks and pines for which you may search in vain—no Chickadees live in Guatemala. Their place is

occupied by a close relation, the Black-eared Bush-Tit, a tiny gray birdling who, instead of the black crown and throat of the Chickadee, wears his black patches covering the sides of the head. His mate is marked by much smaller areas of black which are confined to her ears, while her cheeks are gray. The male's eyes are black, the female's yellow. During most of the year these lively little birds travel through the more open woods and bushy pastures in flocks of from a dozen to two dozen, maintaining a constant, low, lisping conversation, and exhibiting all of the agility of a Chickadee in clinging to the tips of the twigs in every conceivable position, while they pluck from the foliage the small insects upon which they subsist. It is noteworthy that in these flocks the black-faced males far outnumber the gray-cheeked females, perhaps by four or six to one. In one flock which foraged in the garden under conditions very favorable for observation, I counted eleven males and only one female.

In March, while the nights were still chill and frosty, I watched a pair of the Bush-tits building their cozy nest. The site they had chosen was in the top of a thorny bush (*Solanum millense*) just beneath the large purple flowers which clustered at the ends of its branches, high on a bushy mountain-side, where from my place of concealment up the slope I could look out across the high plateau of Chimaltenango, brown and sere after the long dry season, to the three great volcanic cones rising in the east—towering Acatenango, its sister Fuego with a thin wisp of vapor rising from its barren summit, and the perfect cone of Agua.

The nest was a pear-shaped pouch, suspended by its upper end from the twigs, and fashioned of gray foliaceous lichens neatly joined together with cobweb. The top of the pouch was hooded over, leaving only a small circular aperture facing the side, through which the birds were industriously carrying in for the lining bits of such soft and downy material as they could find—tufts of spider cocoons, of the woolly covering of the leaves of the bushes among which the nest was hung, and other kindred substances. Male and female took equal shares in hunting out the down and bringing it to the nest, but the female was far more careful than her mate in arranging this material and in shaping the structure. Their work progressed with much fine twittering, and it was interesting to find that the male was by far the more hesitant in approaching the nest while I stood in plain sight. At a second nest, however, the situation was reversed, and the female was considerably more timid than her mate.

This and the other nests I afterwards found each contained in due time four tiny white eggs, no larger than those of the average Hummingbird. I never dared try to remove them for inspection, but by carefully bending back the hooded top and peering down into the interior with one eye, I could just manage to count them as they lay on their downy bed at the

bottom of the pouch. Even before the eggs were laid, male and female slept together in the nest. During the period of incubation, the pair slept together in the nest each night, a habit which, so far as I know, is shared only by the Blue-throated Motmots (*Aspatha gularis*) who nested in the banks along the roads. In the morning, long after the Thrushes had sung their dawn chorus, the Jays had begun to squawk, and all early birds were abroad, the male emerged from his warm shelter. After snatching a bit of breakfast he returned and called, whereupon his mate came out and he replaced her on the eggs. As the sun dispelled the nocturnal chill, they became most impatient sitters, changing about more frequently than any other birds I have ever watched. Often each remained on the eggs only three or four minutes at a stretch; ten minutes was a long session in the nest while the air was warm. If the bird covering the eggs heard others of its kind chattering close at hand, it answered in fine sibilant twitters from the nest. Often the eggs were neglected while both of the pair sought more down to add to the lining of the pouch, for like the Rose-throated Becard (*Platysaris aglaia*), the Rufous-breasted Spinetail (*Synallaxis erythrothorax*), and other birds which build very elaborate nests, they continued actively to bring material to it until the eggs hatched.

At one nest, situated in a bushy clearing in the woods, I found that two males were flying into the entrance with small tufts of down in their bills. There was a difference between the two, not in appearance, in which they were indistinguishable, but in behavior. One was careful in tucking into the fabric the bits of down which he brought, while the other often fastened them so carelessly that they were brushed out by the passage of the birds through the entrance. So far as I could determine, only one male, the more careful builder, remained to warm the eggs, and only one slept in the nest with the female. The latter was her mate, the other an unmated helper who, unable to find a partner because of the surplus of his own sex, devoted his time to assisting in the domestic duties of the owners of the nest.

Once the young hatched, after fifteen or sixteen days of incubation, their demands for food left no time for making further improvements to the nest, which had already acquired a soft and ample lining, and the helper joined the parents in bringing minute insects and green larvae to the nestlings. Now he was allowed to sleep in the nest, a privilege which was no mean compensation for his labors in its behalf, for in the thin air a mile and a half above the sea the nights are always chilly. Later at least two more bachelors joined in the care of the four nestlings, who now, with their parents and three male helpers, had five attendants to satisfy their wants. Possibly there were more, for unlike the Brown Jays one male Bush-Tit appears, to human eyes, exactly like another, and I tried in vain to make them acquire distinguishing marks by rubbing against the red paint which I smeared on a

twiglet fastened transversely across the entrance of the nest. Had they fed the nestlings no more frequently than the Brown Jays, I might never have suspected their number, but they brought their offerings with such frequency that I sometimes had all four of the males in sight at one time, and made quite certain that I did not count the same individual twice. After a few days another of the helpers began to sleep in the nest, which then sheltered nightly the parents, two helpers and four nestlings—eight in all.

Each of the other two nests I watched had a single male helper, who fed the nestlings and slept with them and their parents every night. One of these helpers took occasional turns in brooding the nestlings. Although I found only males acting as helpers, once I saw a female take an interest in a nest which was not her own. One morning when I was watching from my blind a nest in which incubation was in progress, I was surprised to see a second female accompany the mother of the nest as she returned from a recess. The stranger followed into the nest, but a minute later climbed up to arrange the down in the top, then emerged and perched in the bush close beside it. Soon the male, returning with a tuft of down in his bill, discovered her and drove her away, but she circled around and, after the departure of the aggressive master of the nest, rejoined the mistress inside. A minute afterwards both females emerged and flew away. When the strange female returned later in the morning, the male again pursued and drove her from the bush, continuing the chase among the branches of a neighboring tree, but the persistent stranger returned a third time despite her two rebuffs. Yet after the eggs hatched she did not appear to assist the parents and their male helper in the care of the nestlings. I do not know why the female stranger was not engaged in the duties of her own nest at the time—certainly not because of the scarcity of potential husbands. Possibly she herself was barren and, unable to raise a brood of her own, might have contributed to the care of the others' nestlings had she been given a more courteous reception.

In the three nests over which I kept watch, all twelve of the fledglings, once they were feathered, turned out to be males, and exactly resembled their fathers. No wonder they would have difficulty in finding mates next year! When the young birds have left the nest, at the age of seventeen to nineteen days, neither they nor their parents return to sleep in it. The downy pouch is an admirable protection against the cold nights of the dry season when the Bush-Tits nest, but it takes up water like a sponge and would make a poor dormitory during the wet season, which begins about the time the fledglings take wing; for they are raised in the brief interval of favorable weather, a scant six or seven weeks, which intervenes between the last frost and the beginning of the rains. From May or early June onward the Bush-tits retire to sleep in the tree tops, with naught but the dripping foliage to shelter their vigorous little bodies from the cold mountain rains.

THE BANDED CACTUS WREN.

Heleodytes zonatus zonatus (Lesson).

The banded Cactus Wrens which I studied in most detail were neighbors of the Bush-tits. They are giants among Wrens; slender, sharp-billed and long-tailed, the plumage of their back, wings and tail is heavily barred with blackish and gray, the white breast is conspicuously spotted with black and the belly is buffy chestnut. They travel through the more open woods in noisy family groups of usually six to a dozen individuals, and neglect to investigate no possible hiding places of their insect food. They search the ground; cling to the bark of trees like Nuthatches; pull the gray lichens from the branches to see what may be lurking beneath, like the Blue-crested Jays; move among the foliage like overgrown Warblers. Although their voices are harsh in the extreme, male and female sing duets in unison, in the manner of Wrens more gifted vocally, and what they lack in sweetness of tone they make up in animated, rollicking tempo.

In the evening the whole family retire into their sleeping nest, a roughly globular structure about a foot in greatest diameter, composed of pine needles, moss, lichens, straws, sheep's wool and the like, with a wide entrance on one side, protected by an overhanging roof. These dormitories are generally high in the trees, at the ends of slender branches where they are difficult to reach. Sometimes a single pair occupy a nest to themselves, but I have seen as many as eleven sleeping together, and all intermediate numbers. From time to time throughout the year they build fresh dormitories, no doubt in the interest of sanitation. It is most amusing to watch them arise on cold or rainy mornings. They lie abed much beyond their usual time for arising, which at best is considerably later than that of most of their bird neighbors, then come out slowly, reluctantly, one by one. Not infrequently a Wren, stepping forth to survey a world of driving cloud mist and drenched foliage amid which he must seek his breakfast, will decide that it is still too early and returns to the snug chamber for a few minutes longer. Having gone through the same painful process of emerging into the wet less than an hour earlier, I know exactly how he feels.

In February and March, the period of courtship, there was much excitement, much pursuit and singing on the wing. The Cactus Wrens built no special nests in which to raise their families, but each female laid five white eggs, either immaculate or faintly speckled with brown, in a structure previously occupied as a dormitory, which appeared old and weathered, although it was still in good repair. So long as it contained eggs and young, the mother alone occupied it at night, while the remainder of the flock retired to another of the several dormitories which were scattered about the territory. In April I devoted much attention to a nest situated forty

feet above the ground in an oak tree standing alone in a bushy pasture. The female alone incubated the eggs, but her mate remained close at hand, in company with another Wren, and was always eager to join her in a duet, or follow her, singing, upon the wing, when she came forth to forage. Sometimes he went to the entrance to look in at her as she warmed the eggs, greeting her with queer, harsh notes. After the eggs hatched he brought food to the nestlings. In this work he was joined by the unmated bird who had remained in the vicinity while incubation was in progress, and occasionally looked in to see how things were going. The helper was indistinguishable from the parents, but I stuck a wad of paint-soaked cotton in front of the entrance to the nest, and the bird, brushing against it, acquired some vermilion spots on his breast by which I afterwards recognized him. He was a most faithful attendant, and with the father did most of the work of feeding the nestlings, for the mother rarely brought them food. Her duty was to keep the little ones warm, and she seldom carried an insect to them, as is customary with most birds, when returning to the nest from a recess.

I wanted very much to see whether this interesting division of labor was general among Cactus Wrens, but at the only other nest which was favorably situated for watching there were so many attendants that I could not readily distinguish the mother from her numerous assistants. Five or six birds remained in the vicinity of this nest, and at least four brought food to the five nestlings. Probably the number of attendants was greater than four, but all looked alike, and I never succeeded in keeping a larger number in view at one time, to make sure that they fed the nestlings. At the very least there were two helpers at this nest. After the nestlings could fly they slept in a dormitory nest, not far distant, along with six adults, all of whom not improbably fed them. With the Cactus Wrens it is very difficult to make sure of the number and status of the helpers at any nest, for once the birds have outgrown their fledgling plumage male and female, young and old, are identical in appearance. Possibly the helpers are yearling birds, perhaps older brothers and sisters of the nestlings they attend, who will not themselves breed until the following season.

At the ages of eighteen and nineteen days the fledglings left the nest in the oak tree, and for the next two weeks the whole family, parents, helper, and the three youngsters who survived, went to sleep every night in an old, long-abandoned nest (B) on the opposite side of the tree from the breeding nest. It was the helper who assumed the responsibility of putting the children to bed, and a most interesting time he had of it. The dormitory was difficult of approach for the little birds just out of the cradle and still rather shaky on the wing. Although there were of course twigs all around it, there was none immediately in front of the entrance from which they

could easily hop inside. Somewhat before the usual time for the adults to retire, the helper called the three fledglings to the sleeping quarters. A twig about a foot below the entrance seemed at first the most promising mode of approach, but they soon discovered that to reach the entrance from this point required too much of a jump, and they could not yet fly straight upward. Then they tried the alternative of alighting on the roof and climbing down to the doorway. This, too, was no easy matter, for the edge of the roof projected well forward of the entrance, and when they clung to it they found nothing below to which they could drop. While they were trying time and time again these two equally difficult alternatives, the helper was showing them over and over how perfectly simple it was to fly up to the entrance from below, but what was easy for a grown bird was quite a different matter for a fledgling two days out of the nest.

At length one of the three, perhaps the older by a day, succeeded in effecting an entrance by way of the roof, clinging precariously and almost losing its hold as it came over the edge. The others tried in vain to follow the leader. The helper encouraged them and entered at least a score of times, only to come out again at once, teaching them by example how it was done. Several times a fledgling, rising from the lower perch, just managed to grasp by one foot a fibre or stick below the entrance, but found its powers too far spent to raise itself over the sill, and in a moment lost its hold and went fluttering down among the branches, only to return in a minute for another attempt. Several times, too, one flew up while the helper was at the entrance and clung to his back. With more presence of mind the latter might have pulled it into the nest in this manner, but each time he dropped down with the fledgling holding on for dear life, and the struggle began anew. The efforts of the little, short-tailed, pale-breasted fledglings to imitate their long-tailed, patient instructor formed a lovable scene, but their attempts and failures were also very amusing, and at times I shook with silent laughter until I could no longer hold the binoculars steady.

At length, after ten minutes of repeated failures, the other two fledglings managed to gain their bed. There still remained a bit of daylight, so the helper, after looking into the nest to see that all was well, flew off to join the parents and snatch a few more bites before retiring. In ten minutes more the first of the grown-ups came to bed, followed at close intervals by the other two. As each in turn darkened the entrance, the fledglings greeted him with their lisping hunger calls, associating from life-long habit the appearance of a bird at the doorway with the bringing of food. When the last had disappeared into the interior, all remained quiet in the nest, and I longed to be able to peep in and see by the fading light how the six sleepers had arranged themselves for the night.

I kept this family under observation for the remainder of the year, during

which they occupied five different dormitories. In the middle of May they moved to a nest (C) in an alder tree, about 200 feet from the oak in which the breeding nest (A) was located. During July the young birds, now in their fourth month, began to molt and acquire their adult plumage, their most conspicuous change being the substitution of the white, black-spotted breast of the adult for the immaculate, light buff breast of the fledgling. They occupied the alder tree nest until the beginning of September, when the whole family moved into a new nest (D) which had just been completed in the same oak tree which already held the breeding nest (A) and an old dormitory nest (B). During October they began a second nest in the alder tree, but never completed it, and continued to sleep in Nest D until the middle of November, when they shifted back to Nest A in the same tree. They did not long remain here, and for a while I lost track of them; but a week later I found them sleeping in a newly constructed nest (E) in the top of a tree hawthorn (*Crataegus stipulosa*) about five hundred feet distant from the breeding nest. The family was now reduced to four members, and I could not determine what had happened to the other two. During December they returned to the oak tree and slept sometimes in the breeding nest (A), sometimes in the nest (D) they had built during August. I do not know why this group moved about so much, for another family of nine continued to sleep in the same nest from September until I left them at the end of the year.

In June, after the close of the breeding season, I watched the construction of a nest in territory which had not been previously occupied by Cactus Wrens. Its builders were a pair of birds who were evidently just establishing themselves. They worked side by side at the task of construction, and began to sleep in their dormitory about the middle of the month, although they continued to add material to it for several weeks longer. The pair continued to sleep alone in this nest until October, when I discovered that they had been joined by a third bird, who remained with them until, at the beginning of December, they changed their residence, or met with some calamity, and I was unable to find them again. I suspect that, if everything went well with these birds until the following breeding season, the third Wren would have turned out to be the helper of the original pair.

While the Brown Jays are restricted to the Tropical and Subtropical Zones, and the Black-eared Bush-tits in Guatemala live entirely in the altitudinal Temperate Zone, between five and nine thousand feet above sea-level, the Banded Cactus Wrens enjoy a remarkably wide altitudinal distribution. I have found the species from near sea level in Costa Rica and Guatemala up to nearly ten thousand feet in a clearing in the cypress forest above Tecpán, Guatemala. In the humid lowlands these birds inhabit the older second growth, riverside groves, and woodlands which have been

somewhat thinned and opened by lumbering operations, but, so far as my experience goes, not the heavy virgin forest. In the highlands, where they are far more numerous, they dwell in light woods of oak, alder and pine, or else in bushy pastures where scattered trees remain, and in similar habitats, but avoid the heaviest sorts of forest. The habit of sleeping together in dormitories is not restricted to those individuals who dwell in the cool uplands where nights are frosty, for near Turrialba in Costa Rica, at an altitude of about 2500 feet, I found a family of seven sleeping together, and near sea-level in the Estrella Valley I came upon a dormitory into which two birds retired at nightfall. Probably their custom of seeking shelter from the extremes of nocturnal weather in these commodious nests is one of the factors which enable them to thrive in such a wide range of climates.

To me, the most pleasing aspect of the various associations among birds which we have been considering is that they are entirely voluntary, which puts them on a different and higher plane than those of social insects such as termites, ants and bees. Among these no one pair are complete and able to take care of themselves and raise their families without the aid of other biological forms of their species. With these insects coöperation is obligate, for without it the species would soon become extinct. All birds, save those affected by accident or disease, remain complete in all their faculties; there is no structural or sexual specialization among them, as among the social insects, which makes it impossible for any one pair to live and raise their young without outside help. Perhaps it is necessary to except from this statement only species like Cowbirds and Cuckoos, which place their eggs in the nests of other kinds. Each pair of Groove-billed Anis, as they please, may join in a communal nest with others of their kind, or may build their own nest and raise their young alone. The young Brown Jay who this year helps at the nest of a pair of older birds will next year have a nest of its own; the mated Brown Jays who receive so much voluntary assistance are perfectly capable of raising their family without aid. And so among birds help is given and received entirely in a spirit of good fellowship, neither those who give nor those who receive compromise their independence nor lose their self-sufficiency.

3509 Clark's Lane,
Baltimore, Maryland.

A NEW JAY OF THE GENUS CYANOCORAX FROM
SINALOA, MEXICO.

BY ROBERT T. MOORE.

Plate XIII.

FROM a camp among pines at an altitude of 5200 ft., near the top of one of the highest mountains in southern Sinaloa, Mr. Chester C. Lamb, one of the most reliable and indefatigable of collectors, secured a Jay which is remarkably different from any of its congeners yet known to science. It has its closest affinities with the South American genus *Cyanocorax*, only one of whose members ranges as far north as Panama and eastern Costa Rica. This genus seems to be a pigeon-hole for a heterogeneous assemblage of Jays, with slender or stubby bills, powerful or weak feet, with crests, semi-crests or practically none. The extension of the range of the genus 2000 miles to the north is as surprising, as that so conspicuous a bird has not been discovered previously by expeditions, which have crossed Sinaloa a short distance north and south of its mountain habitat. That its range is restricted is manifest. Assiduous collecting for the past three years by Messrs. Lamb and Wright in different areas of the mountains of southern Sonora and northern and southern Sinaloa, and previous collecting by J. H. Batty to the south and also to the east in Durango have not revealed a single specimen. Batty spent an entire year within 75 miles of its habitat and for a month combed identical altitudes on La Balla and Juan Lisiarraga Mountain not 35 miles away! Clearly a remnant from a more flourishing past, it is not uncommon in its limited range, where Mr. Lamb secured eight specimens.

My deep appreciation is extended to Dr. Alexander Wetmore of the Smithsonian Institution for his generosity in checking and confirming the conclusion of the author, that the best treatment is to find a niche for this bird in the genus *Cyanocorax*. I also offer my thanks to the Field Museum of Natural History and to the American Museum of Natural History for the generous loan of specimens of various species of the genus.

In naming this Jay it gives me particular pleasure to pay tribute to the memory of Donald R. Dickey, who, prior to his death, was Associate in Vertebrate Zoology at the California Institute of Technology. His unflagging interest in the birds and mammals of northwestern Mexico and his generous financial support of the work of the California Institute in that area, render this attribution particularly appropriate. For some time the author has been waiting for the discovery of a species worthy of his memory and now welcomes this opportunity to express a tribute to a splendid intellect, a vivacious companion and a treasured friend.



CYANOCORAX DICKEYI MOORE





Cyanocorax dickeyi sp. nov.

TUFTED JAY

Type.—Male adult; No. 12342, collection of Robert T. Moore; Rancho Batel, 5 miles N. E. of Santa Lucia, Sinaloa, Mexico (altitude 5200 ft.); Nov. 7, 1934; collected by Chester C. Lamb; original field number 20463.

Specific Characters.—Differing notably from all species of *Cyanocorax* in having entire forehead and fore part of crown adorned with a straight, stiff and erect crest, which tends to segregate at the apex into numerous tufts of stiff, narrow and unusually elongated feathers (30 mm. or more), each tuft being truncated at its vertex having the appearance of being clipped by a pair of shears; each feather of crest very narrow with almost parallel sides and with barbs generally bare and lacking barbules; wing decidedly longer than tail (10 mm.); primaries, with exception of first (outside primary), unusually broad, almost as wide at tip as in medium section, straight instead of incurved, and gabled at the end in a very obtuse angle; possessing a superficial color resemblance to *Cyanocorax mystacalis* (Geoffroy Saint-Hilaire) of southwestern Ecuador, but differing, not only in all the characters mentioned above, but also in much larger size; shorter, thicker bill; malar white patch twice as large; color of upper parts much darker Azurite Blue;¹ outer rectrices blue on outer web for more than basal half, black on inner web for more than one-third, instead of being pure white; white tips of median rectrices twice as long and immaculate white, and white of nape much less extensive. Females seem to be identical with males but slightly smaller.

Geographical distribution.—Seven of the eight known specimens were secured in the mountains of southeastern Sinaloa, east of Mazatlan, at an altitude of about 5200 ft. One single individual was obtained at 3900 ft. at the lower border of the pines. From this altitude to the top of the range, according to Mr. Lamb, the growth consists of mixed oaks and pines. It would seem, therefore, that the species does not descend below the pines and is confined to the crests of the Sierra Madre of southeastern Sinaloa.

Description of Type.—Adult male, no. 12342, collection of Robert T. Moore, apparently just completing a late fall moult. Crest, lores, erect semilunar area above superciliary spot, post-ocular region, throat-mask connecting post-ocular region and sides of neck with upper and lower throat glossy velvety black, with the throat somewhat duller, the semilunar area more glossy and velvety, some of the crest feathers Eton Blue along the shafts² and a small spot of Cornflower Blue just above lores; posterior feathers of crest white at the base; posterior portion of crown, occiput, nape, hind-neck and extreme upper back, posterior sides of neck, large semilunar superciliary patch, large triangular patch extending from base of mandible to a point on neck well beyond eye; entire underparts, except throat, including under tail-coverts, thighs, legs, axillars and under wing-coverts immaculate snowy white, the superciliary and malar patches being faintly tinged on the margins with very light blue; the white area of the nape connecting with the white underparts by a narrow band of white extending around the semi-circular black shield of the throat; rest of upper parts including all exposed portions of wings and basal two-thirds of exposed portion of rectrices, between Indulin Blue and Hay's Blue, the back being duller inclining towards Indulin Blue, and the wings varying between glossy Cya-

¹ Capitalized names of colors in paper taken from Ridgway, Color Standards and Color Nomenclature, 1912.

² This blue marking of the crest feathers is very conspicuous in other specimens, particularly in female No. 12341, and male No. 12601 in the Moore Collection.

nine to Hay's Blue when viewed from different angles; two-thirds of the basal portion of feathers of lower back and rump white, the blue tips being very short on the lower rump and permitting the white to show through in places; inner webs of primaries and outer secondaries glossy black above, entire primaries and secondaries glossy grayish black below; outer webs of primaries which, except for a small portion of the tips, are completely covered by the secondaries, lighter colored, Deep Cadet Blue; basal two-thirds of median pair of rectrices on both webs glossy Hay's Blue to Indulin Blue when viewed from varying angles, the blue area being a trifle longer on the inner webs; basal one-half of outer web of outer rectrix Hay's Blue, inner web glossy black, the blue on the outer web being nearly an inch longer than the black on the inner web; basal portion of outer webs of all the other rectrices Hay's Blue, inner webs black, the blue area in each case being more extensive than the black, the combined dark areas extending farther posteriorly on each feather counting from the outer to the median feathers, so that when the feathers are partially spread, a large semi-circular blue-black area is exposed for the lower two-thirds of the tail; outer one-half of exterior rectrices and outer one-third of median rectrices immaculate snow white; under side of basal dark areas of rectrices glossy black on both outer and inner web.

Specimens examined.—6 ♂, 2 ♀ of *Cyanocorax dickeyi*; also specimens of *C. affinis*, *C. affinis zeledoni*, *C. mystacalis*, *C. cyanopogon*, *C. cayanus*, *C. cyanomelas* and *C. violaceus*.

Average Measurements in millimeters of *Cyanocorax dickeyi*.

			Length	Depth		
			Bill fr.	Bill at	Middle	
	Wing	Tail	Nostril	Nostril	Tarsus	Toe Minus Claw
Six adult males	180.4	171.3	23.47	12.9	45.3	29.7
Two adult females	177.1	164.2	23.2	12.2	45.9	28.4

Remarks.—Hellmayr in the recent 'Catalogue of Birds of the Americas,' Part VII, recognizes nine species and three additional races in the genus *Cyanocorax* Boie. Three species, *chrysops*, *heilprini* and *caeruleus* have not been examined by me, but the descriptions of these differ so greatly from *dickeyi*, that there can be no confusion with it. The peculiar crest of *chrysops*, with the tips of its feathers turned upward, removes it at once from consideration. The same distinction applies to *C. chrysops tucumanus* Cabanis. *C. chrysops diesingii* Pelzeln, as described by Hellmayr, possesses a straighter crest than *chrysops chrysops*, but has different markings and is a much smaller bird. *Cyanocorax heilprini* Gentry displays, according to Hellmayr, a "brown purple-tinged . . . breast, abdomen and under wing-coverts," instead of the white underparts of *dickeyi*. Similarly the blue under surface of *Cyanocorax caeruleus* (Vieillot) eliminates that species.

When Ridgway reduced the limits of the genus *Cyanocorax*, as conceived by R. Bowdler Sharpe in the 'Catalogue of the Birds in the British Museum,' by four species and eliminated three others as synonyms, he was still confronted by an inharmonious group of eight species, which he designated under a very brief general description, in order to take them all in. Hell-

mayr, following Ridgway's treatment in general, included *Pica caerulea* Temminck, which Ridgway felt should be removed on account of its "conspicuously exposed nostrils and differently constructed crest." In addition, Hellmayr restored *C. tucumanus* Cabanis and *C. diesingii* Pelzeln as races of *chrysops*, and *C. heilprini* Gentry as a full species on the basis of newly discovered material. This last treatment still leaves *Cyanocorax* as a heterogeneous assemblage of Jays with many dissimilar external characters. For instance, *chrysops* has a crest with the tips turned upward, *heilprini*, according to Hellmayr, has a "much lengthened, stiff, . . . erect frontal crest" while *cyanomelas* has scarcely any crest at all. Most of the species have the nostrils hidden, but *caeruleus* has them "conspicuously exposed." Three species, *violaceus*, *caeruleus* and *cyanomelas*, have the wing obviously longer than the tail, whereas *cyanopogon* has the tail obviously longer than the wing and most of the others have wing and tail about the same length. The majority of the species have short heavy bills, but *mystacalis* has a long slender one. In addition, the two specimens I have seen of *cyanopogon* have much slenderer legs and feet than the other species.

Cyanocorax dickeyi does not seem to resemble closely any of these recognized species of *Cyanocorax*. It does fit Ridgway's brief description of the genus, and has in addition the heavy feet of most of the species, the extremely long wing of *violaceus*, the color pattern of *mystacalis*, and a bill intermediate between the slender one of the last and the short ones of most of the others. It differs from all species in the shape, construction and length of the crest, in the peculiar character of the individual feathers, and apparently in the shape of the primaries. Regarding the last, the outer and inner webs of the primaries are unusually wide and there is no suggestion of a point to the feather, as there is in all species of *Cyanocorax* which I have examined. Of these only *C. affinis zeledoni* approaches it, and then only in the width of the distal end of the feathers.

Regarding the "tufts" of the crest, these are not true tufts, for they do not segregate at the point of origin in the feather tracts, but separate only at the apex, into groups of about three feathers. These feathers seem to be much longer (10 mm.) than those of any species of *Cyanocorax*, not excepting those of *C. c. diesingii*, which Hellmayr states measure "fully 20 mm."

It is worthy of note that *dickeyi* is farthest away in characters from the geographically nearest species of the genus, namely, *Cyanocorax affinis zeledoni* of southeastern Costa Rica and Panama. In coloration it comes closest to *Cyanocorax mystacalis* of Ecuador, 1300 miles farther away, and in the important matter of crests to the more distant *chrysops diesingii* and *heilprini*, both of Brazil. One of the largest of all the species of the genus, it seems without question to be the handsomest in its brilliant contrast of white, black and glittering purple.

California Institute of Technology, Pasadena, Calif.

AN EXPERIMENTAL STUDY OF SEX RECOGNITION IN BIRDS.

BY G. K. NOBLE AND WILLIAM VOGT.

Plates XIV-XV.

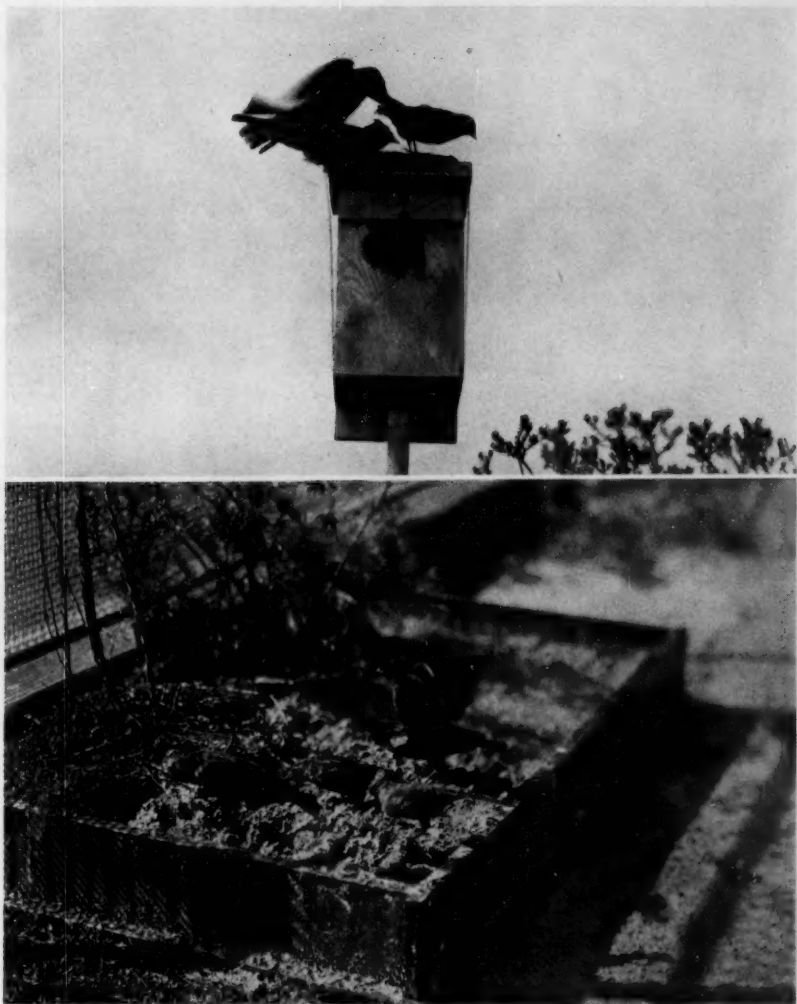
THE methods of sex recognition in domesticated, or at least captive, birds, have been extensively studied by Craig, Whitman, Heinroth, Schjelderup-Ebbe and others, but the conclusions reached by these investigators have not been widely applied to problems of field ornithology. Whitman, in his exhaustive monograph on the behavior of Pigeons, states that captive Mourning Doves, for example, "like ring-doves, do not know the differences between the sexes until they meet and exchange salutations. The male's place is to coo and strut, while the female retreats, bowing and showing herself off if she happens to be disposed. If she does not retreat, the male tests her by pecking and claiming his mastership. The behavior is the only guide they have in selecting a mate of the right sex. This may seem incredible, but it is certain." (Publ. 257, Carnegie Inst., Washington, Vol. 3).

In some domesticated birds, as well as in some wild species, the behavior by which the male identifies the receptive sex may be extremely simple. Long ago Audubon described the fierce conflicts between male Wild Turkeys. When one bird has been killed "the conqueror treads him under foot, but, what is strange, not with hatred, but with all the motions which he employs in caressing the female." In the Ruffed Grouse, where the courtship ceremonies closely approach in their simplicity those of the Turkeys, Allen (Auk, 1934, pp. 180-199) has secured abundant evidence that the male will frequently mate with a prostrate bird of either sex. Allen's experiments led him to conclude that the Ruffed Grouse "and perhaps all species of birds, are not cognizant of sex as such, even during the breeding season, and that sex reactions are based primarily upon differences in size or vigor of individuals irrespective of sex."

This conclusion is at variance with the views of the above mentioned investigators who have studied domesticated birds. Craig, for example, concluded: "The male pigeon usually knows the sex of each bird in the flock, and is always ready to play up to the females. When a new bird comes to the flock he does not seem to be so sure of its sex at first; but he tests it by display behavior. If the newcomer proves to be a male, he then pays less attention to it." (In Whitman l. c.)

In other species of domesticated birds the identity of each individual in a flock is well known to the members of the flock, for each has a particular place in the pecking-order (Schjelderup-Ebbe¹). This is the more remarkable in that individual differences in the members of the flock often cannot be seen by the human observer. If birds are endowed with such a

¹ *Forsch. Völkerpsych, Soz.* 10: pp. 77-137.

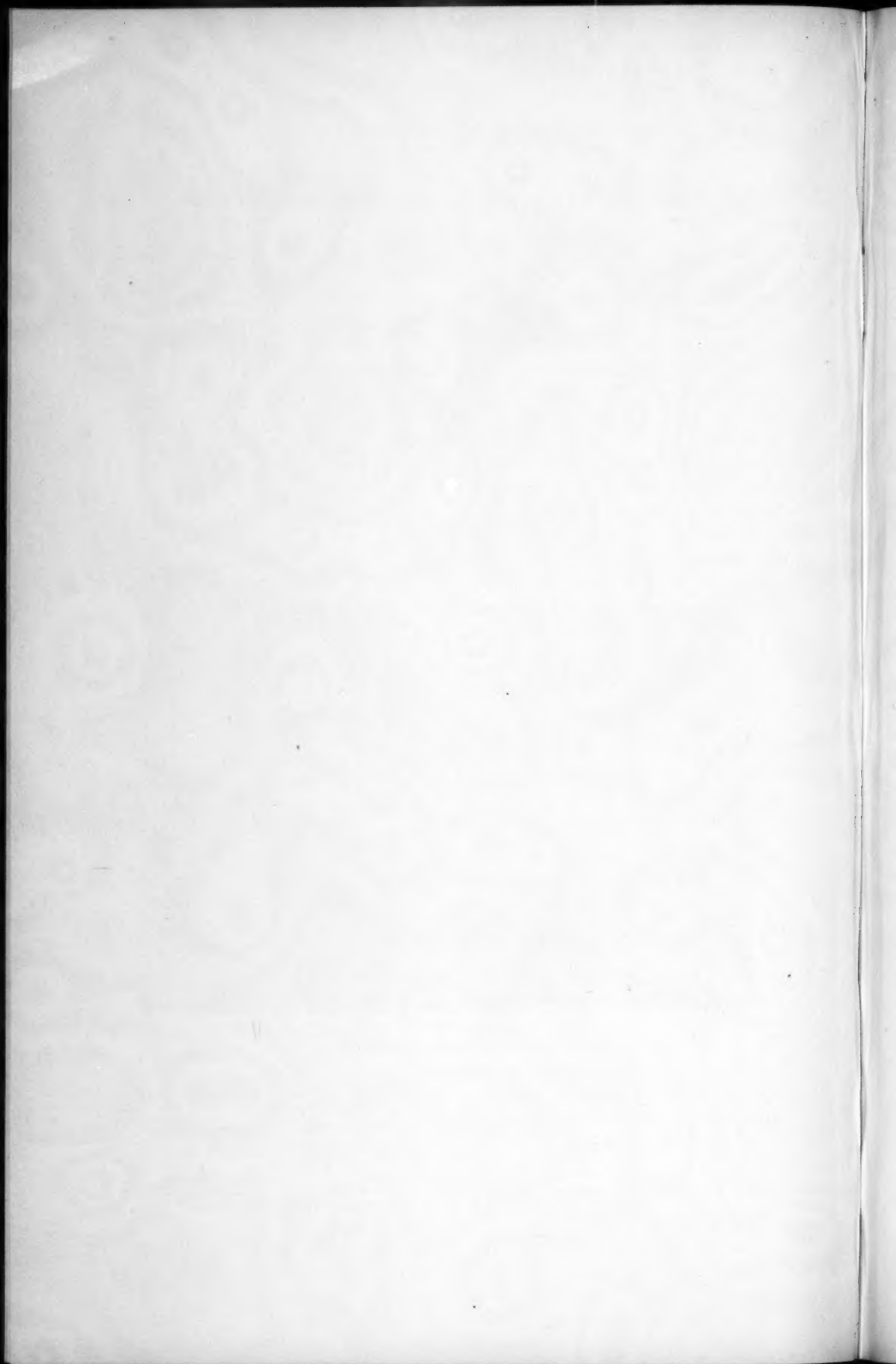


SEX DISCRIMINATION IN RED-WINGED BLACKBIRD.

UPPER: MALE ATTACKS MOUNTED MALE BIRD; MATES ONLY WITH FEMALE.

LOWER: YOUNG RED-WING MALE FAILS TO DISTINGUISH SEX OR SPECIES IN SEVERAL MOUNTED BIRDS.





keen sense of vision and have such a memory for personalities among their bird associates, as Craig, Schjelderup-Ebbe and others have proved, it would seem remarkable that sexually dimorphic birds should not make use of the sexual differences in form or color as visual cues. Nevertheless, in spite of the considerable amount of work in recent years on the courtship of birds, no one has shown by experiment to what extent this holds true.

In view of this situation, we have considered it desirable to test the ability of several species of wild birds to discriminate sex solely on the basis of visual cues. Allen, Chapman and others have shown that males of several species will attempt to mate with mounted females of their own species. Where there is little sex dimorphism, as in the Ruffed Grouse, males will also mate with the skins of males. This was one of the reasons why Allen assumed that birds were not cognizant of sex. No one has previously offered to males of strongly dimorphic species mounted birds of both sexes for discrimination tests. Here, of course, the males would have a greater opportunity of making use of visual cues if these were actually of importance in sex recognition.

We turned our attention first to the Red-wing Blackbird (*Agelaius phoeniceus phoeniceus*) for the species is abundant in the brackish marshes of the Jones Beach State Bird Sanctuary which were available to both of us. We tested males in this area before any females had arrived on their territories. These birds apparently had had no sexual experience for the greater part of a year. Nevertheless, their responses to the female mount were markedly different from those to the male.¹

The following observation, made April 18, 1934, when the temperature stood at 55° F., illustrates the response of a male that has not yet received a female into his territory:

At 8.34 A. M. the male Red-wing fluttered toward the male mount, which had been placed on the edge of bird house well within the territory of this bird. He flattened himself close to the boards and with tail spread, wings drooped and epaulets erected he lifted up his head and sang. After some time he climbed to the ridge on the back of the bird house and began to peck at the male mount. He did this rather casually until 8.44, when he knocked the mount from the house and followed it down into the grass.

Three minutes later, at 8.47, the mount was fastened back to the top of the bird house. The observer had scarcely returned to the observation post when the male flew to the mount and attacked it vigorously. After hammering with his bill for some time he sang for about 10 seconds from the top of the bird house and then once more attacked. This time, standing on the back of the mount, he used his feet as well as his bill.

At 9.00, after this complex response lasting 13 minutes, he pursued another male flying across his territory. (It should be emphasized that up to this time the owner-

¹ The mounted birds employed in this study were loaned by the Department of Education of the American Museum of Natural History.

male did not pay a great deal of attention to nearby males; they were permitted to cross the territory without molestation.) This interloper was driven off, however, and the owner-male now apparently spied the female mount for the first time. This had been placed on another bird house a hundred feet from the male mount but still within the territory of the same owner-male. He rushed to the female mount, copulated with it, flew away, and dashed back to repeat the performance. He then flew in a wide circle, repeatedly giving the *keening* note so familiar to intruders near a Red-wing's nest, but which had not been heard previously this spring.

At 9.03:30 he flew back to the female mount and attempted copulation. He then pecked this mount at the base of the tail, both above and below, before again attempting copulation. It should be noted that the female mount was gently pecked in the cloacal region, whereas the male mount was so furiously attacked in the head as to tear a large hole in the skin. When the male did not evoke a response on the part of the female mount, he again resumed the cloacal pecking until he knocked the mount to the ground.

The male and female skins used in the above experiment were mounted in nearly the same pose. The long axis of the body was nearly parallel with the ground and the head was turned slightly. Later in the season we used a female Red-wing that had been mounted with the tail lifted at an angle of 45 degrees to the ground, and the bill directed downward. The male copulated no more frequently with this bird than with the other. Both female mounts would eventually evoke a gentle pecking in the cloacal region. This was apparently a sign of annoyance on the part of the male.

We were able to secure a differential response to the mounted male and female birds as late as May 26. On this date a male, presumably the same individual tested in the above experiment, copulated with a female mount and fought a male mount when these were placed either together or alternately on top of the same bird house utilized in the above experiment (Pl. XIV, a). The male returned again and again to peck viciously at the male mount, while he usually ignored the female mount. Only twice on this day did the male copulate with the female mount. A mounted female Chewink (*Pipilo erythrophthalmus erythrophthalmus*) and a mounted Starling (*Sturnus vulgaris vulgaris*) in winter plumage placed in the same spot as the female mount had occupied, were entirely ignored. Hence there was not only a sex but a species recognition on this late date. The fact that the male directed his attack only toward the male mount showed that late in the season the male defends his territory more against males of his own kind than against birds of other species. Further, the fact that this bird fought far more frequently than he copulated was evidence that sexual interest fades earlier than an interest in territory defense.

It was a significant fact that while the male, in attacking a male mount during either April or May, usually erected his epaulets, these were less frequently displayed before copulating with the female mount. Hence these ornaments, which are usually assumed to be employed by the males

to stimulate the females to mate, have an even more important function as intimidating devices to be directed against rival males.

We repeated our experiments with the Northern Yellow-throat (*Geothlypis trichas brachidactyla*). Again we selected a male that seemed to have assumed guard over a territory and after making sure that no females had yet arrived in this territory we placed mounted individuals of the two sexes in conspicuous places within this area. These mounts were similarly posed and they were placed in a variety of positions within the territory. Again the male, that had presumably no sexual experience that year, differentiated readily between the mounts. He attacked only the male and copulated only with the female. We recorded 11 attacks on the male mount and 15 copulations with the female. These observations were made on May 11 and 16, 1934.

Since the mounts were similarly posed, it seemed that the male Northern Yellow-throat was discriminating between the sexes primarily on a basis of color pattern. In order to secure further evidence to support this assumption, we drove the bird from the female mount immediately after copulation and quickly placed a mask of black paper across the mount's eyes. This mask was glued to the mount's face and gave a rough approximation to the distinctive facial pattern of the male. Two minutes later the male returned to the mount and began to copulate. Suddenly he jumped into the air and dashed away. Apparently he had seen the mask. This was removed at once but the male did not return until 24 minutes later when he flew at the mount and began to peck viciously the top of the mount's head from above. After a few seconds he slipped posteriorly and again copulated with the mount. Since this was the only attack on the female mount at any time it seems highly probable that the mask, or rather the memory of it, was the disturbing factor.

The above experiments with Red-wings and Northern Yellow-throats show that the males of some dimorphic species clearly distinguish between sex on the basis of visual cues alone. The question arises: Were these sexually experienced birds that had become conditioned to the sexual differences in pattern the previous year? The birds we tested were not banded and we had no way of determining their age. Nevertheless the observations of Whitman and others have shown that birds reared with other species will attempt to mate with these instead of with their own kind when they mature. Aside, then, from any basic pattern of courtship which may be an inherited characteristic of the species, birds become conditioned to their associates. The male Red-wings and Northern Yellow-throats had presumably learned from experience to fight with individuals having the color pattern that identifies the male sex. Although this conclusion would seem certain from the observations of Craig¹ on Pigeons reared in isolation,

¹ Jour. Animal Behavior, IV, pp. 121-133.

we decided to test the question by working out the responses of young birds to mounts. Unfortunately this could not be done in the field because we could not locate the territories of any male Red-wings in their dapple plumage of the first year. Many of these males with yellow epaulets and brown superciliary stripes were congregated on the edge of one of the swamps and we captured a series for testing under controlled conditions. At the same time a series of fully adult males was captured and the two lots were released in a large flying cage, 18' x 6'10" x 7'10". When these birds were offered a series of mounted birds of many species we found that the old birds, those in second nuptial plumage and having bright red epaulets, usually copulated only with the female Red-wing mount, while the birds in first nuptial plumage would copulate with nearly every species presented. Brightly colored species, including a male Cardinal (*Richmondia cardinalis cardinalis*), a Blue Jay (*Cyanocitta cristata cristata*), a Meadowlark (*Sturnella magna magna*), a male Chewink, and a Love Bird (*Melospittacus undulatus* Shaw), were mated with as frequently as were dull colored forms, including a Wood Thrush (*Hylocichla mustelina*), a Fox Sparrow (*Passerella iliaca iliaca*), a Northern Shrike (*Lanius borealis borealis*), a female Chewink, a Rusty Blackbird (*Euphagus carolinus*), a Cowbird (*Molothrus ater ater*), and a female Red-wing. The male Red-wing mount was never attacked by any male, although there was considerable bickering among the live males. This was probably correlated with the fact that all the birds were in a strange territory. Still it is of interest that the copulatory responses continued with as great or even a greater frequency than in the field.

A few of the experiments may be described in detail: May 20, 12.20 P. M. Mounts of a male Red-wing, a Hermit Thrush (*Hylocichla guttata faxoni*), a female Chewink and a male Cardinal were arranged facing the same way and six inches apart in a single row. At 12.22 a fully adult male copulated with the female Red-wing mount. A moment later a first nuptial male mated with the male Cardinal mount. At 12.30 another young bird copulated with the male Red-wing mount. At 12.40 a fully adult male again selected the female Red-wing mount.

Although the males with a maximum amount of red on the shoulders tended to mate only with the mounted female Red-wings, they were not infallible, especially when the test was difficult. One case will illustrate the point:

May 20, 10.02 A. M. The following mounted birds were placed in a row with their long axis making an angle of 45° to the margin of the sand box (Pl. XIV, b) in which they were placed: Cedar Waxwing (*Bombicilla cedrorum*), female Cowbird, female Red-wing, Pine Grosbeak (*Pinicola enucleator leucura*) in winter plumage, male Red-wing and Blue Jay. The Cowbird, Grosbeak and Blue Jay were placed approximately 2 inches higher than the others, making it easier for the birds to mate with them.

At 10.03 a fully adult male copulated with the female Cowbird mount and then turned immediately to the female Red-wing mount and repeated the movements.

At 10.09 another adult male walked past 3 of the mounts and selected the female Red-wing mount to give a series of typical copulatory thrusts.

At 10.10 a fully adult male flew to opposite edge of the sand box and walked deliberately around the Waxwing and female Cowbird to give full copulatory movements while clinging to the back of the female Red-wing mount.

At 10.14 a first nuptial male copulated with the Blue Jay.

At 10.45 the series of mounts was arranged: female Robin (*Turdus migratorius migratorius*) female Red-wing, male Red-wing, female Cowbird and male Cardinal, in single file and only 2 inches apart. The female Cowbird was placed half an inch higher than the others but since it was not next to the female Red-wing there was presumably less chance for confusion.

At 10.52 a fully adult male walked deliberately around the Robin and copulated with the female Red-wing.

Between May 17 and June 5, 11 male Red-wings were tested with the mounted birds arranged in a great variety of ways. During this time the males with the maximum amount of red on the shoulders selected the female Red-wing mount and copulated with it on 37 different occasions. Only 7 times did these same males copulate with mounted birds of other species or with mounted males of their own kind. On the other hand, male Red-wings that were undoubtedly birds of the first season, selected and copulated with the female mount of their own species only 3 times while they exhibited copulatory behavior 24 times with mounts of other species or with mounted males of their own kind. On 28 different occasions, the male Red-wings that copulated with mounts of other species or with males of their own kind were birds of intermediate age. Some red was present in the epaulets but there was less of this color than on the fully adult birds. These birds lacked the buff of the males in the first nuptial plumage. Since the male Red-wing in approaching the mounted bird to copulate rarely displays, it was difficult to be sure that some of these intermediates were not fully adult. This grouping of the birds into fully adult, definitely young and an intermediate group, while inexact, was sufficiently definite for the purposes of this experiment. The young birds tested in exactly the same way as the birds with maximum amount of red had far more difficulty in selecting females of their own species. But even the males with the maximum amount of red did not make perfect scores and no doubt the crowded conditions in the flying cage made selecting of the proper mount far more difficult in the laboratory than in the field.

As stated above, Allen and others have shown that some birds with little sexual dimorphism are apparently incapable of recognizing the sex of birds of their own kind. The question remains, Are these birds capable of distinguishing their own kind from other species approaching them in form and color? We have tested this question with the House Wren (*Troglodytes aedon aedon*). A male House Wren that was cleaning out a bird house shortly before a female joined him in his labors was tested on May 9 with

a mounted House Wren of unknown sex. He copulated with the mount at once. On May 12, after the female had arrived, he was tested again and with the same result. The female attacked the mount twice, but soon both birds grew indifferent to the mount. On May 19, a mounted Winter Wren (*Nannus hiemalis hiemalis*) and a mounted Long-billed Marsh Wren (*Telmatodytes palustris palustris*) were placed alternately where the mounted House Wren had been. The male copulated with the Winter Wren and ignored the Long-billed Marsh Wren. Very soon, however, he grew indifferent to the mounts.

On June 17, this same male, apparently, had moved to the vicinity of another bird house and was calling for another mate. The House Wren, Winter Wren and Long-billed Marsh Wren were placed in a row 3 inches apart on one of the stout branches of a rose bush near the house. In the course of 2 hours the male had copulated 7 times with the Winter Wren, twice with the House Wren, and had approached the Long-billed Marsh Wren only once in a mating attitude. The Winter Wren resembles a House Wren far more closely than does the Long-billed Marsh Wren and hence it was not surprising to find the male more interested in the mounted Winter Wren. It was, however, interesting to note that the House Wren would mate as readily with the mounted Winter Wren as with a mount of his own species (Pl. XV, b).

Although the unrestrained Red-wing males had shown no interest in mounted birds of other species and had neither attacked them nor displayed any sexual behavior toward them, the question remained: To what extent are other sexually dimorphic birds so discriminating? We have tested 3 male Golden Pheasants (*Chrysolophus pictus* (Linn.)) at the Jones Beach State Bird Sanctuary. One of these had killed his own mate a week previously and the others had mates in the cages with them during the experiments. A mounted female Ring-necked Pheasant (*Phasianus colchicus torquatus*) when placed in the cage of the lone male, in either a standing pose or a prone one, called forth first a display, and later copulatory movements. Sperm preparations were secured during these movements. A Golden Pheasant male mounted in the same pose, in the cage of this bird, brought forth no display and no mating, even when his legs were buried until his body made contact with the ground (Pl. XV, a). A Ring-necked male also stimulated no courtship behavior, no matter what the pose. On the other hand, a female Silver Pheasant (*Gennaeus nycthemerus* (Linn.)) mounted in exactly the same pose as the other mounts, called forth a display but not a persistent one. The Ring-necked female resembles a Golden female more closely than does the Silver. Hence, the greater the divergence from the female Golden type, the less the persistence of courtship.

A live Golden Pheasant introduced into the cage called forth a vigorous

attack. Here were factors of cage ownership and threat of attack entering in. A mounted male Golden Pheasant, in the cage with a mated male, had its head ripped to pieces by the enraged owner. These observations, although few, clearly show that a male Golden Pheasant a week after the loss of his mate can distinguish between the sexes, and not on the basis of posture but presumably on the basis of color pattern differences.

The male Golden Pheasant, unlike the male House Wren, Northern Yellow-throat or Red-wing Blackbird, displays to the female mount before copulating. The Wren would frequently raise his wings to a horizontal position and flutter them nervously while hopping rapidly toward the mount. Male Red-wings would also elevate their wings during their approach, but this was not a definite display such as the Golden Pheasant exhibited. Friedmann (The Cowbirds) has shown that a male Cowbird will display to a mounted female. This difference in mode of response to a mounted female is correlated with the greater amount of display in the courtship of the Cowbird and Golden Pheasant than in that of the Wren. It is interesting that the Red-wing, which is frequently supposed to display with his epaulets, should react toward a mounted female more as the Wren does, than as the Pheasant. It raises the question of the real function of the epaulets in the social life of the Red-wing.

Many birds exhibit a series of mate feeding or sham nesting ceremonies instead of display during courtship. No one has previously tested the responses of this group of birds to a mount. We have made a single experiment with the Common Tern (*Sterna hirundo hirundo*). A mounted bird placed near a nest of 3 eggs in a Tern colony on South Oyster Bay induced well marked courting responses in a bird that may or may not have been the owner of the eggs. The bird approached the mount in silence, settled down on the sand, and revolved on its breast to make a "cock nest." While revolving, it kicked sand out behind with vigorous thrusts of its small feet. Then it rose in the air and settled behind the mount to make another cock nest on the other side. As shown by Tinbergen (*Ardea*, XX, pp. 1-18) this is part of the typical courtship of the Common Tern. Whether the courtship would have reached the fish passing stage earlier in the season is impossible to say. Chapman¹ found that the courtship of Gould's Manakin was shortened in the presence of a mounted bird. It is possible that the silent, quiet form of a mounted female is sufficiently stimulating to make other birds abbreviate or entirely give up their courtship. The behavior induced by a mounted bird may give a very incomplete picture of the full courtship of a species. Nevertheless, the mounted bird technique as employed in the experiments reported above has shown that some wild and domesticated birds recognize sex difference and carry these differences in their minds for long periods.

¹ Natural History, Vol. 32, pp. 470-480.

CONCLUSIONS.

The male Red-wing Blackbird (*Agelaius phoeniceus phoeniceus*) and the male Northern Yellow-throat (*Geothlypis trichas brachidactyla*) can distinguish the sex of mounted birds of their own species, even early in the year before females have arrived on the breeding territories. These highly dimorphic birds are therefore sex conscious at this season in that they respond differentially to sex when only visual cues are available to them.

Under laboratory conditions, Red-wing Blackbirds in the first nuptial plumage are less successful in selecting mounted birds of their own species and opposite sex than are the fully adult males. Even under natural conditions, a bird may not be able to select his own species with accuracy. A House Wren (*Troglodytes aedon aedon*) will mate as frequently with a mounted Winter Wren (*Nannus hiemalis hiemalis*) as with a mounted bird of his own species. On the other hand, a mounted Long-billed Marsh Wren (*Telmatodytes palustris palustris*) is usually avoided.

A male Golden Pheasant (*Chrysolophus pictus*) will court and mate with a mounted female Ring-necked Pheasant (*Phasianus colchicus torquatus*) or court a mounted female Silver Pheasant (*Gennaeus nycthemerus* (Linn.)). The latter, which diverges more from the pattern of the Golden female, aroused less interest in the Golden Pheasant. The posture of the mounted bird has no influence on the type of response. Mounted male Pheasants are either ignored or attacked but not courted.

A mounted Common Tern (*Sterna hirundo hirundo*) will call forth a courtship performance in a breeding bird. The Tern and the Pheasant differ in their response from the House Wren, Northern Yellow-throat and Red-wing Blackbird, which usually attempt to mate without courtship. This difference in behavior is correlated with the more elaborate courtship performance of the first two species.

*American Museum of Natural History,
New York City.*

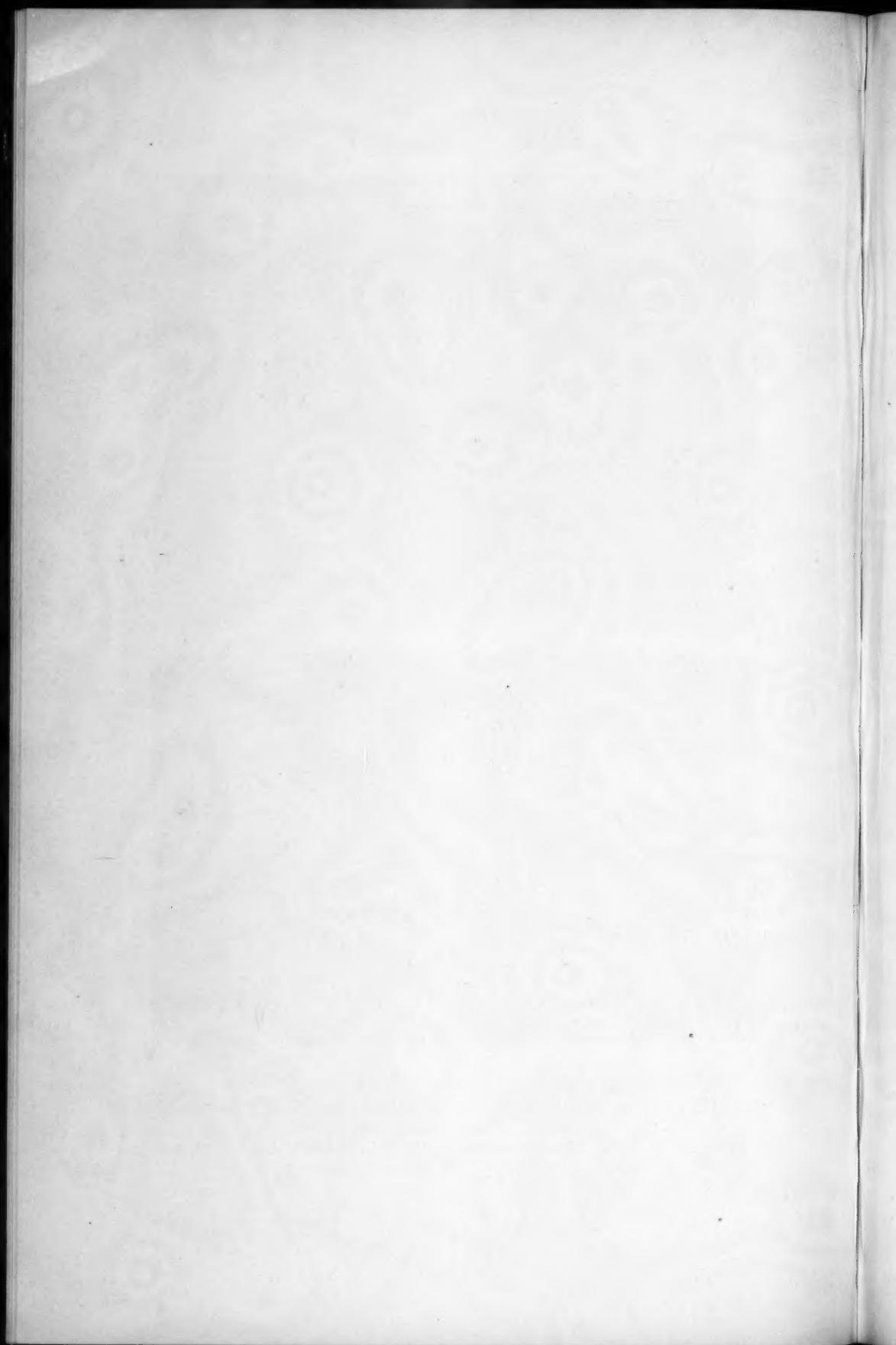


RESPONSE OF MALES TO MOUNTED BIRDS OF OTHER SPECIES.

UPPER: MALE GOLDEN PHEASANT DISPLAYS TO MOUNTED FEMALE RING-NECKED;
IGNORES MOUNTED MALE GOLDEN.

LOWER: MALE HOUSE WREN MATES WITH MOUNTED WINTER WREN IN PREFER-
ENCE TO MOUNTED HOUSE WREN.





NOTES ON THE GROWTH, BEHAVIOR AND TAMING OF
YOUNG MARSH HAWKS.¹

BY LEWIS O. SHELLEY.

THE Marsh Hawk or Harrier (*Circus hudsonius*) is an uncommon resident in this vicinity. In his 'A List of the Birds of New Hampshire,' (1903) Glover M. Allen cites it as "an uncommon local summer resident." Previous to the year 1929 I had only a few records of individual birds. So when a nest was found some twelve miles distant on July 2, 1929, containing four young, it seemed a good opportunity for an intimate study.

The nest was situated on the ground at the upper end of a three mile reservoir in the midst of a wild tract of withe-rod bushes (*Viburnum cassinoides*), interspersed with hardhack (*Spiraea tomentosa*), swamp grass and sedges. The nest proper when fresh had been built four inches in depth on a bed of sphagnum moss (*Sphagnum cymbifolium*), it was compactly made of grasses from the immediate vicinity with innumerable dead sticks and twigs from nearby elms and maples, and was about eighteen inches in diameter, slightly hollowed, and retaining its shape long afterward. Immediately in front was a space about two and a half feet square where the birds had trampled the vegetation flat and where the young birds evidently stayed when the nest became too small. While thickly surrounded by the screen of waist-high bushes, the nest was only about seventy-five yards straight in from a state highway.

The female flushed from the nest at eight feet and, instead of attempting to defend the young flew off after circling a few times. The young were balls of white down with eyes closed, apparently but a day or two from the egg. There were green oak leaves in the nest.

On July 11, the adults were not in evidence. A few days previous the female had been flushed from the nest late in the afternoon and on this occasion the feathers at the side of the head were expanded in such manner as to give a rounded look to her face astonishingly Owl-like. In the nine days since they were first seen the young had grown so that one bird was as large as all four together at that date; the white down was replaced by buff and gray with a white spot on the back of the crown, which remained white until the head was feathered. The feathers extended about an inch beyond the sheaths and down showed on wings and tail; on the shoulders a few dark feathers protruded just out of the down.

The young were brightly alert, all attentiveness in a wild sort of inquiry

¹ Thanks are due to Elmer Colwell for finding the nest. To W. L. McAtee for substantiating the identity of certain bones. And to Mr. George C. Atwell, of the Audubon Society of New Hampshire, for many valuable suggestions and criticisms.

at the observer's approach; they showed no sign of fear until an attempt was made to pick them up when they stood up on their wobbly legs and with the wings as means of locomotion scattered into the protection of the bushes at the nest rim. Replaced in the nest the two larger turned on their backs and attacked the proffered hand with both beak and talons, but without the strength to inflict a skin wound. The nest was trampled, filthy with excrement and over-run with carrion beetles. Cleanly in habit, the young backed away a foot or more from the spot they happened to be on and discharged excreta to a distance of two feet, so that it was difficult to understand the filthy condition in which I found the nest at this time. It is interesting to note that Urner,¹ in his studies of this species, found nest sanitation more clearly marked. There was a new batch of green oak leaves in the nest on this date, somewhat dried from the heat.

Three of the young were now taken from the nest and carried to my home. From their slight difference in size I numbered the birds 1, 2 and 3 respectively, and they are so referred to beyond. The youngest of the brood was left in the nest in the hope that the adults would not leave the vicinity.

From the first no restraint was placed upon the young birds except to confine them in a wire enclosed yard. They went whenever and wherever their inclinations directed them. In this wise the observations would seem to apply to a certain extent to their actions under natural conditions and for that reason together with the degree of their acquired tameness I offer these notes. Their development would seem to correspond very nearly to young in the wild state as observed by Dr. A. A. Allen.²

At four weeks of age Number 1 was given away since it showed signs of a fiercer nature and a greater tendency toward wildness than either of the other two and I disliked keeping it where its moods might tend to overshadow their more domestic ones. A week afterward it was taken to the woods and liberated.

Plumage. Once begun the feathering was rapid. It seemed the more the birds ate the faster they developed both in size and strength. The feathers grew so fast that the daily progress could be noted. While the wing and tail quills were only an inch long, and only a few feathers showing on the back and auriculars, when the birds were taken, in a week's time feathering was one quarter complete, with the first rufous feathers showing through the down above the tail, on the breast and at the bend of the wings. A week later, at three and a half weeks, feathering was complete but for innumerable bunches of down on the wings, back and over the forward half of the crown; they were fully feathered with the juvenal plumage at four

¹ Urner, Chas. A. Notes on Two Ground-nesting Birds of Prey. Auk, Jan. 1925, Vol. XLII, No. 1, pp. 31-41. (p. 40).

² Allen, A. A. Mother Marsh Hawk Tells Her Story. Bird-Lore, Sept.-Oct. 1929, Vol. XXXI, No. 5, pp. 356-367.

weeks, when flying commenced. The upper parts were a deep fuscous, the wing coverts peppered with rufous spots, and the wing and tail feathers barred with ashy-brown-black and ochraceous-buff. The tail coverts were white, and now the sexes could be determined: Numbers 1 and 2 were males, Number 3 a female. Until feathering was complete all three birds spent hours preening to free their bodies from the sheath scales and to exercise the growing plumage. They seemed to enjoy the bright sunlight as though it advanced their growth. At six weeks Numbers 2 and 3 underwent a change in coloring. All the upper parts and wings, especially the nape, shoulder and bend of wing, took on a silver-gray sheen over the fuscous, slightly changeable in different lights, a color between ashy-gray and fuscous, not so light a pearl-gray as in the adult male; and dimmer in the immature female.

Until four weeks of age their feet and tarsi were cream-yellow in color, when they changed to a deep yellow, acquiring the adult shade at about eight weeks of age. The talons were deep black. The bill was black up to the cere, which became and maintained a greenish-yellow color.

Food Habits. It was noticeable that their greatest appetite was during the period of mass feather production, at from two to four weeks, self-preservation mastering any feeling of sharing the food. Obtaining a morsel, one would cover it with the wings, scold and complain, neck hunched ready for a possible fray, and at an opportune moment clutch the meat in the talons and carry it to a distance. At first, after losing innumerable feathers from vicious attacks by the older bird, the younger ones learned to wait, not without constant complaint, until the former had gotten a piece of food and satisfied his wants. However, they soon learned to spar back. They were as fond of kidney as the Owls reared by Reed.¹ It became their choice food, taken in preference to any meat except wild game, and continued to be as long as they remained with me.

When young they could not tear the food and I resorted to cutting it in pieces. No movement in the procedure escaped their notice and when I had finished, one bird could not be told from another in the struggling melee. From the first they were fed regularly three times a day and grew to expect food at regular hours as punctually as clockwork. If it were not forthcoming they would come to the house and call incessantly.

At three weeks they began to show a preference for tearing their own food, holding a large piece in one foot, usually the right, and ripping off small pieces. Later, when they had been on the wing some weeks and came to feed from meats I held on a board, a piece would be grasped in one foot as the bird took it in flight, a common practice. If taken

¹ Reed, Bessie P. *Growth Development and Reactions of Young Great Horned Owls*. Auk, Jan. 1925, Vol. XLII, No. 1, pp. 14-31, (p. 20).

in the beak it was sometimes grasped in the foot after flying. They would carry half a large beef kidney, an equivalent to the weight, approximately, of five or six field mice, with one foot held flexed beneath the tail and the one holding the meat hanging straight down. Any small food was carried up against the belly. Experiments at feeding showed that they would try to swallow pieces larger than would pass the gullet, when they would sit back on the hocks and gulp with a backward and forward movement of the head, jerking the wings, and when successful would "worm" the head and neck to aid in placing the food in the crop or in moving the crop itself. Even at ten weeks, they would gorge to the limit when fed. This would seem to be a characteristic of the wild Hawk to guard against a possible scarcity of food supply.

Food consumption varied in degree. Once two full grown frogs and fifteen pollywogs were taken by each of the three at one feeding, whereas, on the other hand, when grown to "juvenal" stage a third of a beef kidney sufficed for the two. Living pollywogs would be treated with a severe peck or two, or until subdued, and swallowed head first, often when still alive. As soon as they mastered the handling of their legs they carried food and preferably fed separately. Until then they had apparently enjoyed each other's company at all times. On one occasion they ate liver until they could swallow no more, later vomiting up a portion just as it had been swallowed, showing that in a half hour the digestive juices of the stomach had not worked upon this portion of the food although the outline of a filled crop had become obliterated.

On only two occasions were they given birds. Besides kidney, frogs made up the bulk of their diet, mice coming next. A Sparrow found dead in the road and a Catbird were the sole feathered food they had until they began to hunt for themselves. At the age of five weeks Number 2 came one morning when called and refused to eat. The reason was evident as on the left foot were a few whitish feathers from a small bird and a spot of blood, testifying to his skill as a hunter. While she may have done so, Number 3 showed no evidence of catching wild game.

Pellets. The first pellet was found on the morning of July 12, the day after the birds were taken home, a second late in the afternoon, and a third the next morning, showing that a pellet may lie for hours after food is consumed before being ejected. This was later substantiated, with rarely a deviation. The first pellet contained much mouse fur and the lining of a Blackbird's gizzard, but there were no bones in evidence, which leads to the conclusion that up to this date the young had been fed little material with bones. The second pellet was largely of mouse fur and material that could not be identified. The third pellet had some mouse fur, small pieces of bone, and almost an entire Japanese beetle (*Popillia japonica*), besides a

red ant that had not been acted on by the digestive fluid but which had been taken before capture, a matter of some twenty-four hours. All three pellets had more or less grass and grass seed throughout, which had not been gotten in close proximity to the nesting site and had been taken probably the day of capture. The first pellet was the largest ever found, being two and a half inches long by an inch thick, rounded on one end and tapering to a point. None of these Hawk pellets had so much of a sticky mucous film covering them as I had found present in Owl pellets. In all three pellets the contents were from food taken previous to the time of capture late in the afternoon, at which time their crops were full. However, in a few hours, they readily took some small tadpoles. The first pellet to appear from food taken after capture was ejected the morning of the 14th, over two days later.

Five days after capture a small pellet was found, newly ejected, comprised of waste material taken both before and after capture. The former comprised a number of small white stones about half the size of a pea, which could not have been taken in captivity since until this date the Hawks were on a board flooring; likewise there seemed no chance of the young having picked up these stones near the nest. From this I conclude that the parent birds fed the material for the same reason a domestic fowl teaches her chicks to eat small stones and oyster shell. It is interesting to surmise the reason the stones remained in the gizzard approximately a week when some fed for experiment later were ejected with the next pellet. Why were these first stones ejected at this time and not in accord with the twenty-four hour period of later experiments? For about two weeks they continued to take stones furnished with the food, then discontinued their use as food grinders to any extent. This would seem to show that their need for grinding food was largely in the earlier weeks.

It has since been determined that after the first three or four weeks, food with bones furnish all the grinding matter that is necessary to a thorough disintegration of the food; but because they are not so sharp as small stones, unless crushed and splintered, a larger amount is necessary for the requirement of roughage such as fur and feathers, and this, in itself, would seem to furnish a sound reason for a pellet composed mostly of bones being ejected in precedence of one made up principally of feathers or fur as the case may be; and would explain the unjust accusation that pellets are misleading.

Experiments made by feeding entire skulls and jointed sections of mouse bodies brought pellets in which these pieces were disjointed and the skulls crushed to bits. How this mastication was accomplished is not clear. In a few instances skulls came up separated evenly along their seams. The pellets varied greatly as to size and shape, but all were solid and com-

pact in construction. When about to eject a pellet the bird would sit still and appear dull, but that was all. They were known to eat just before and after ejecting a pellet. Pellets were never found newly ejected save early in the morning. On one occasion house mice were fed for breakfast, a Sparrow two hours later, then, in the afternoon, a field mouse was fed. Examination of the three pellets next morning showed all three materials so mixed together that it was difficult to separate the two colored furs and feathers. Usually, however, a sharp line of cleavage showed between the materials fed at different hours. Especially was this noticeable with frog refuse. When mice and frogs were fed at one meal, the waste frog matter was invariably on the larger end of the pellet, even though fed at random. This was always so, whether because it was the heavier material could not be determined. It is certain that these Hawks did not require such an amount of roughage with their food as I had found necessary with a Barred Owl (*Strix varia varia*). They would feed on kidney for days at a time without any roughage whatever. All three would take a greater bulk of fur than of feathers, preferring to pluck the latter meats as clean as possible before swallowing.

Notes and Calls. From the first they had two distinct calls or notes. One was a squeaky whistle uttered, usually, when they were hungry. This was habitual in an increasing degree of intensity until full grown. The other was a softer note, shorter in duration, a contented chittering heard after feeding or when they were hungry and during the night, like the noise young chicks make when the hen broods them. This note was confined solely to the first few weeks.

Accompanying feeding hours at the age of three weeks, a new note was originated by Number 1 and was in evidence from then on, taken up readily by the other two at the same age. It was a feeding call. That is to say, it would be uttered when the bird was shielding its food and voicing its authority. It was a note full of wrathful superiority, a subdued chuckling with a dash of braggadocio, as it were, from which any of the three would retreat hastily. It was toned to a guttural throaty cry, rolling to a diminutive ending, in a word the closest to a scream of any call yet attained, and was in fact the only feeding note with any semblance to a scream until the bird was eight weeks of age. While it was a screamed cry, it was not syllabled the same, nor did it mature into the later adult scream, differing distinctly in both pitch and tone, although it was occasionally heard when the birds were ten weeks old, along with the adult scream. This latest note (the adult scream) was first heard when the Hawks had been on the wing four weeks. It was a more moderate whistled scream, taking more time than the above mentioned to acquire a ripened perfection, like the vocal change of a boy's voice changing to manhood. Number 3's voice was always different than the male's. Her notes were not so modulated, and

while in a minor key were louder and uttered more rapidly than their calls. Also she had a habit of calling more continuously than they.

Sight. With age the Hawks showed an increased interest in the things about them. For instance, there were a number of black ants abounding over the piazza which they would watch sharply at the age of two weeks, cocking their heads in various attitudes of questioning doubt. They would follow a wagging finger in the same way, though more sternly. Later at the age of three or four weeks they got to associate a finger or the hand with food since they were fed in this manner a good deal, and if passed at them empty they would bite it just the same, as though they could not discriminate a finger from meat. Often, before they could fly, they watched the activities of Swallows sailing through the air, at a height greater than fifty feet. Like an Owl, they possessed the faculty of turning the head in a three-quarter circle to keep something of interest or doubt in the line of vision.

The study of their eyesight was very interesting. Having finished a meal they would scan the ground in anticipation of a stray bit of food, though full-fed. Often when searching like this they would grasp one of their toes. When in a fighting mood one bird would grasp his own wing if the wing bow suddenly crossed his line of vision. He apparently imagined it was one of the other bird's wings he was biting until the pain seemed to create the idea that one of them was biting him, when he would grip all the harder for revenge until release alleviated the pain. This was a common happening.

At feeding time if one bird lost his grip on his food and dropped it into the tall grass when flying to the woods, he was never observed to leave it but stopped in mid-air poised above the spot, at over ten feet, until the sharp eye detected it where it lay on the ground, and then, alighting, would eat it. On several occasions where I could not find a piece of meat about an inch square, after searching keenly, the Hawk would pick it up instantly. I believe this illustrates well the power of the eyesight when a foraging Marsh Hawk sails low over a mowing searching for field mice. Small chance a moving body has of escaping the piercing, keen eye!

The color of the eye had not changed from the first up to ten weeks except to grow from gray to a deeper shade of brown. The pupil could be enlarged or dilated at will and often was at feeding time when quarreling seemed to affect the mood and therefore the eyesight. A light suddenly thrust into the bird's face brought no response. When intently watching some moving object, the pupil might change in size, dilating and enlarging with a winking movement of the whitish eye film, that was all.

Hearing. That the hearing was acute goes without saying. The slightest noise would be heard and the direction from whence it came noticed unfailingly. On moccasined feet I have tried to creep around the shed, where the

birds were often fed and came to roost, without their hearing me, but was never successful. My presence was detected and the Hawks would be looking my way when I peeped out at them, poised ready for flight if it were other than myself. A cricket chirping in the grass, my voice in the house, or any suspicious noise whatever brought instant response. At the age of two and a half weeks all three had shown an innate curiosity at the muffled sound produced by tadpoles jumping about inside a closed pail.

A noise like this which could not be detected and its presence ascertained caused suspicion, which is the forerunner to fear.

I tried whistled calls at various pitches to see what response they might bring. A sharp, concise whistle brought them screaming in a rushing expectancy directly at me; a low, long-drawn-out whistle seemed not to unduly excite but brought them in a circuitous, unhurried flight overhead where they would circle questioningly, turning the head from side to side to see what I might want; a spasmodic, modulated whistle was known to be an answer to their calls and brought no response except the usual whistled scream in answer. They soon learned what whistles at various pitches and tones meant and responded accordingly.

Perching and Repose. Before their legs had become strong enough to bear their weight, the Hawks usually rested on the tarsi, in a sitting posture. Until the time of flight, when handled they would relentlessly grip for a secure footing. With the art of flying and perching mastered they gradually lost this death-grip hold. When three weeks old they had become proficient in standing upright with any degree of equilibrium on a flat surface; but up until four and a half weeks could not perch on any sized branch without falling. It was noticeable that prehension was more marked when food was being held, at which times I could not open the closed claws without using both hands, with birds five weeks of age. If a piece of meat was covered with the hand, the grip of the foot on the hand was severe enough to cause pain although the talons passed around a finger without puncturing the skin. When a piece of kidney was placed on a post and fastened by a string to the camera shutter, Number 3 would grasp the meat so quickly and surely in flight as to entirely impale the meat on the talons in such a way that the bird was often thrown to the ground in an effort to release its hold when the string did not give way.

Actions, Reactions and Behavior. The Hawks were given a large, roomy dry-goods box, open on one side, for a nest when young, and treated it as such, going into it whenever they were sleepy and desired to rest, or to escape the bright sunlight on hot days. They also showed a tendency to enter the lawn shrubbery apparently for the same purpose. It was surprising what an amount of strong sunlight they could stand at times. Even though the heat would be so intense that they gaped and panted, there were intervals when to bask became an apparent enjoyment.

They used both wings and feet as means to further locomotion and when not sitting down used the wings spread out for balance, even before these members had become feathered. At three weeks of age they began to exercise the wings by beating them as in flight, and possessed the power to raise their bodies, but not the toes, clear of the ground. Many times a day they exercised either in this manner or by running over the ground and at the same time beating the wings above the back. The first flight made by each was not by way of being preparatory flying. Except for hop-flying from the ground to the top of their dry-goods box, they simply lifted themselves with one stroke and sailed off when the time came, or, I should say, flapped away. Number 1 went from the yard into the road passing the house when the automobile leaving the garage frightened it, and thence into the garden on its first flight. Number 2 went into the garden, twenty-five yards distant, at one hop. And Number 3 flew approximately a quarter-mile in a wide circle, having stopped momentarily on the garden fence to get second wind, so to speak. The first few days following the initial flight a good share of the day was spent on a brush heap by the garden fence, where they practiced balancing, grasping and clutching small limbs by rising a few feet in air and in descending grasping a secure footing, and hopping about. The order of their practice was methodical. For a few nights they returned to the nest-box, then for a time perched in the grass and in the trees at the edge of the woods across the lot back of, but within good view of, the house, later going deep into the woods out of hearing from the house. They would be gone after the evening meal at about 6:00 p. m., for the night, and could not be heard to respond to calls until their appearance early the next morning. Some mornings they would come soon after six o'clock, again not until eight or nine, or whenever hungry.

For two weeks following the initial flight, the Hawks had wallows in the tall herdsgrass across the brook back of the house where they stayed during the day when not flying and where they carried food to eat it. Later they began perching in trees, and when they had food to tear up might alight either on the ground or on a limb. As a rule they flew lower or just above the tree-tops, except when carrying food or responding to calls. They were never observed to glide over the ground in evident watch for food, probably because they did not have to. Once Number 3 was seen to flap just over the grass tops for a distance trying to detect where a piece of wood which I had tossed aside landed. What hunting they did was never seen. They were not known to do any high sailing, nor did they sail at all to any extent, until about four weeks after the initial flight. On brisk, windy days after that they would frequently mount high in air by spiralling and soar long at a time.

Whenever the screened side porch door was opened and the Hawks were

at the edge of the woodland in a favorite apple tree which commands an unobstructed view across the back lot, they began to call and fly to the house expecting food, but would wheel back again if any other member of the family than the one who fed them, appeared. Number 3, however, has been known to alight on the head of the lady of the house. I have started from the village store with kidney, whistled the call notes which meant food, and watched the Hawks come screaming. Seeing the food that I would hold out toward them they would invariably keep along with me at a height of thirty feet, dipping as though to alight and wheeling at and around me until we reached home, eagerly wistful in their haste to be fed.

Number 3 showed a trait bordering on abhorrence at having a kitten eat alternate pieces of kidney with her. The Hawk would show an almost vengeful hatred. This same trait has been observed to some length with a captive Barred Owl in connection with a black-and-white cat; but whereas the Owl would always attack, the Hawk did not. I have wondered if this reactive trait could be an inbred hatred toward the skunk.

At about eight weeks of age both birds were decidedly lame in the left foot, which perhaps can be accounted for by the fact that young Hawks often miscalculate in judging their distance when launching at prey and thereby the legs may be injured.

Until about eight weeks of age they spent a stated period of time at play after having been fed. A piece of bark or a stick of wood would be played with, pounced upon, worried, picked up and tossed about and grasped in the talons, as a cat will play with a mouse. Serious as were their activities, there were times when they touched on the absurd, the blasé or the humorous. The tall swale grass growing along the stream was a source of constant delight as a place to frolic as well as a place of concealment during the day.

There were very few instances when water was provided that they drank; but once on the wing it became a habit to alight along the stream to drink after meals. At one spot where muskrats had a "bed" consisting of grasses and lily-pod leaves, the Hawks would alight up to their bellies in water, where they might wade about, perhaps drink, sometimes bathe, or remain standing still for some time. When bathing, they invariably waded in up even with the wings and dipped and ducked and splattered the wings in complete abandon of enjoyment. Once Number 2 alighted in the middle of the stream in four feet of water and bathed "on the wing," as it were. With such an excess buoyancy to its light body it could float quite easily with wings and tail spread to their utmost extent upon the water.

Fear was shown more as distrust. This is illustrated by their dread of the camera toward the last of their presence with me. It became customary for the Hawks to sit on a post at a distance and watch the camera intently if it were in evidence, distrustful of its presence, yet assured that while I

held it no great harm pended. Let me lay it down and they would fly off in haste screaming loudly. When hunger reigned over this fear, as it did occasionally, and they conceded themselves to partake of food, the muscles of the legs could be seen to work and the wings quiver in readiness to take flight upon any slight suspicious movement with the camera.

Some humans are prone to look upon predacious birds as fierce, cruel demons from which all the lesser beings flee in fear of their lives. It gave me the greatest consolation, therefore, to see the fall migrants—Vireos, Warblers, and Sparrows of many species—feeding contentedly in the very tree, on the same limb with one of the Hawks. Nor have I ever seen an attempt to attack this their natural food as one might suppose they would. On the other hand, on a few occasions, Starlings and Kingbirds have been known to give chase to the raptors, who paid no more attention to their serious attack than they would to a butterfly.

Tameness. At the age of two weeks the Hawks had learned to distinguish from the other members of the family the one who fed them. So they also learned to set up a clamorous din whenever I came in sight. Looking back, I believe that because only one person fed them, (except for a brief interval of several days), because they learned to come to me for food when hungry rather than my taking it to them, and because when out of sight they learned to come to a certain whistle,—these things brought about their taming to a state where I could handle them, whereas they were afraid of any other human being. Early they learned to fear an automobile, a fear that never lessened.

It was not uncommon for one or both Hawks to be gone a day at a time. On August 24 after a heavy thunder shower the night before, Number 2 did not return and was gone for a thirty-six hour period; Number 3 did not put in her appearance until the 29th. She could barely fly due to injuries sustained to both wings, and was in a starved condition insensible to anything but the craving for food, while her monotonous pleading calls expressed her pleasure at being back. And after that date she was tamer than ever before. It is such instances as this that bring about perfect tameness in birds as well as in mammals.

On several occasions Number 2 has followed me quite a distance, returning home when I entered a building or went out of sight. Both Numbers 2 and 3 began to call and came to me whenever I came in sight at all times, and we "talked" through the whistled notes. I have watched to see if they would answer another person, but they never did.

While I did not try particularly to tame them, the Hawks arrived at this point as a natural conclusion from environmental freedom and from the care they had. I know of no published instance of this kind where Marsh Hawks were tamed. To have them come from the woodland in response to

a whistle they recognized as far as it could be heard, was indeed full recompense for the time and money required. Once they flew nearly a half mile from me and just as they were disappearing from sight I whistled once, twice, and they turned and came back, circling above me in expectancy, since I made it a rule never to call them without a reward of some kind. The perfect trust they placed in me, the perfect freedom with which they answered, was enough to make one feel veritably like Saint Francis of old.

Since the foregoing was typed, the Hawks have answered to a call and broken the ties that bound them through their taming. Both birds on each occasion showed a restlessness a day or two before leaving, and the last day would fly high in the air, and when fed took the food to the woods to eat. They were erratic in behavior, but would respond instantly when called. Number 2 left September 4 during the night. Its behavior as it left after feeding that evening was no different than formerly, nor was that of Number 3 on like occasion. It was simply an uneasiness they did not understand or, understanding, could not bring themselves to resist. Number 3 was fed rabbit for the last meal, as it happened, over which it showed a ferocious feeding reaction not evidenced before, and appeared more restless than hungry. It left that night, September 15. An odd coincidence is that both left on a night of very low temperature. It may have been that they had a forewarning of the coming cold. I have little doubt but that they went south and that Number 3 remained longest because of its very marked tameness and desire for companionship.

On September 15, a visit was made to the nest site. Evidence showed conclusively that the fourth young Hawk had been reared to maturity. Two pellets were found. One had been composed almost wholly of bones—the femur and tibia, humerus, metacarpal and digits of a cotton-tail rabbit (*Sylvilagus transitionalis*). The other, a very large pellet, contained six small pieces of broken bone and two chisel teeth from a meadow mouse (*Microtus pennsylvanicus*), a three-sixteenth inch circular piece of mica, the wing and black shell-like segments of a wasp, and two shades of fur. The two teeth show plainly that they were firmly imbedded in the skull when swallowed. Yet the absence of skull and any pieces of bone larger than the teeth prompts me to suggest a theory I have been propounding from observations on pellets ejected by the tame Hawks; namely, that when an excess of bone matter is taken together with fur and other refuse, the bones come up in one pellet with just enough other material to ease ejection, while the larger mass of waste comes later in a separate pellet. When frogs and furred food were taken at one time, the frog matter being of tough skin to which the backbone adhered, came first in one pellet, then the remaining materials in another. There were instances, however, when the two weighty components were in one pellet, but always the frog matter came first at the larger end.

Returns.—It might seem unfortunate that these three Hawks were not banded with Biological Survey bands. But there can be no question, even so, but that they afforded returns.

From April 14, 1930, to about the middle of May three Marsh Hawks (two males and a female) were about my home, the males in complete adult plumage. On May 8 the female first answered my whistled calls. Their actions and familiarity with the surroundings and apparent unconcern as they almost daily visited near the house seemed convincing beyond question, especially since the species is rare at this vicinity, while breeding on the river flats.

One, and possibly two, returned in 1931. On April 13 a male was perched on a fence post at the house, calling. He showed no sign of fear as I approached, gave the old familiar call once, then turned and took wing, leisurely, still watching me. He lingered for a few days at a nearby swamp-meadow through which coursed a brook, as the female and a male did in 1930, and I suspect would have nested (both seasons) had it not been for numerous fishermen.

Only one male returned in 1932, on April 3 when he came to the house for a short period then flew out to the swamp-meadow. He showed but little interest in my whistling the old calls.

Box 22, East Westmoreland, N. H.

GENERAL NOTES.

The Common Loon in the Florida Keys.—As a slight extension in the recorded winter range of the Common Loon (*Gavia immer immer*) in extreme southern Florida it is of interest to report a fragmentary metatarsus from an Indian kitchen midden on Big Pine Key. The specimen in question was collected on February 18, 1935, by Gerrit S. Miller, Jr., near the base of a mound about three feet in depth in a deposit believed to antedate the coming of white men. The bone is preserved in the collections of the National Museum. A. H. Howell, in 'Florida Bird Life,' 1932, p. 73, reports that this Loon is rather rare south of Charlotte Harbor and records one seen at Cape Sable as the most southern record.—ALEXANDER WETMORE, *U. S. National Museum, Washington, D. C.*

The Water-turkey (*Anhinga anhinga*) in Clarke County, Georgia.—On March 25, 1935, Mr. C. M. Bell of Bishop, Georgia, brought a Water-turkey (*Anhinga anhinga*) to the Zoology Department, University of Georgia, Athens, Georgia. Mr. Bell reported his surprise at having the bird fly into his oil truck while driving along U. S. Highway "29" about one and one-half miles north of Athens. The bird fell to the ground as if wounded. It died shortly after being brought to the Zoological laboratories, and at autopsy was found to be shot in the head and body. The specimen was a female.

The species is strictly an inhabitant of the costal plain area and the taking of it this far above the fall line is of unusual occurrence. This record, so far as we know, is the first for Clarke County or this far north of the fall line in the state of Georgia.—FRED DENTON AND E. E. BYRD, *Univ. of Georgia, Athens, Ga.*

Spring Migration of the Gannet in Southeast Florida.—From March 31 to April 6, 1935, I was on Biscayne Bay and among the keys from Miami, Florida, south and west as far as Long Key. Twice during this period I went off shore into the edge of the Gulf Stream and on both occasions found Gannets (*Moris bassana*) there, moving past the coast apparently in northward migration. On April 1, off Angel Fish Creek, seven were counted (2-3-2) flying north close to the water, four in adult and three in immature plumage; on April 5 off Ragged Keys, a little further north, 75 were estimated flying northeasterly (20 ad., 55 imm.). They flew more or less higher than those observed on April 1 and the direction of their flight was less definite but none were fishing on either occasion. The weather was consistently fine, and the wind southeasterly on April 1 and northeasterly on April 5. Only once did I see the species over inshore waters, a glimpse of a flock of about twenty, which had apparently just flown in from outside, on April 3 at Long Key on the bay side, estimated as half adult and half immature birds. This was the largest single, definite flock, the next largest, on April 5, being eleven, and there was no segregation whatever of white and dark birds, which were usually seen flying together.

Presumably north-bound Gannets from the Gulf of Mexico round the Florida Keys and do not cross the Peninsula. In this connection Pangburn mentions fourteen Gannets in various plumages seen passing Indian Rocks Key on the Gulf Coast, flying south on April 9, 1934 (Auk, LII (2), p. 198).—J. T. NICHOLS, *New York, N. Y.*

Double-crested Cormorants at Harrisburg, Pa.—On May 3, 1935, I watched nineteen Double-crested Cormorants (*Phalacrocorax auritus auritus*) in the Susquehanna River at Harrisburg, Pa. They were close enough for field glasses to reveal

very distinctly the recurved tufted crest and the entire absence of any white about the lower jaw or on the flanks. First seen resting upon the river, they were later seen at three different times flying in single file at about five feet above the surface and with outstretched necks. They then were noiseless. Mr. Richard May watched these birds with me. An hour later two Cormorants flew above me near open woodland a mile east of the river. For certainly over a minute before they came into view I heard a call from them, about as loud as that of a Goose. This call was not one of fright. It was a rather harsh croak, entirely different from the call of any Duck or Goose, but came with the frequency of a Goose's call. The birds flew about a hundred feet overhead and distinctly showed the markings of the Double-crested. This experience is interesting as Bent considered these birds mostly noiseless. After 5 P. M. the same day I saw seventeen of these Cormorants settled, apparently, for the night on a grassy island which was then only an inch or two above the surface of the river. A few Herring Gulls, a few Common Terns and four White-winged Scoters (*Melanitta deglandi*) were with them. The next morning the Cormorants were not found, but in the afternoon Merrill Wood and I counted nineteen of them in the river and later four were apparently feeding near a distant island, swimming with the body wholly immersed and the long black necks performing gyrations. There are no records of more than a single Cormorant being seen in this neighborhood.—HAROLD B. WOOD, M. D., Harrisburg, Pa.

A Migration of Mute Swans.—Mr. William R. Lodge, since 1911, has propagated Mute Swans (*Sthenelides olor*) and other waterfowl on Silver Lake located near Akron and Cuyahoga Falls, Ohio. Each autumn, for several years, the Mute Swans have displayed a distinct urge to join other waterfowl in the southward migration but, being pinioned, were unable to do so.

The United States Biological Survey reported that they lacked any data on the migration of this species in America and regretted that they were unable to furnish bands with which to mark these birds. Nevertheless, Mr. Lodge decided to permit the birds to migrate if they cared to do so as an experiment, even though the flock was valued at perhaps \$200. Eight of the birds, leaving the old pinioned pair on Silver Lake, took up residence for two months on the nearby Crystal Lake. The flock indulged in a great deal of flying and one bird died of a broken neck from colliding with telegraph wires along the Pennsylvania Railway.

The remaining seven birds sat on the ice of the lake December 8, 9 and 10, 1934, refusing food made available at the old feeding places. On December 11 they left. On December 15 a single unmated three year old bird returned to partake of food with the old pinioned pair and remained. The six departed birds included a three and a half year old mated pair, a single bird two and a half years old and three birds raised in 1934. Another pair of yearling birds sold to Fells Lake Park at Northfield may have joined these six. Mr. Lodge speculated as to whether the Swans might follow the Ohio-Mississippi system south or join wild Whistling Swans in an overland flight to Chesapeake Bay. As it seemed plausible that the birds might move only far enough to find open water, Mr. Lodge appealed to the writer to attempt to locate his birds at Buckeye Lake or along the Ohio River.

By coincidence, in late December, 1934, he did secure some information of a flock of Mute Swans along the Ohio River, while visiting in West Virginia. George M. Sutton, Thomas Shields, J. Russell Hogg, W. E. Howard and others of the Wheeling area, furnished information concerning the slaughter of a flock of Mute Swans which are believed to be the same birds liberated by Mr. Lodge at Cuyahoga Falls, Ohio.

Eight of these alighted on the Ohio River near New Cumberland, West Virginia,

on December 13 (two days after the Swans left Cuyahoga Falls), an air distance of about 65 miles. Three men from the Ohio shore shot into the flock on December 13, killing six birds. One bird was unharmed and has remained in the vicinity. The eighth bird was wounded and captured but has since recovered. Mr. W. E. Howard, game protector of West Virginia and a United States deputy game warden, writes that he has taken the offenders into custody and is holding them under heavy bond on four counts. Mr. Howard described the birds as being pure white, weighing from 25 to 30 pounds each, measuring 56 inches from tip of beak to tip of tail, and the wounded bird having a wing spread of seven feet.

Stray Mute Swans are frequently reported in the East and Midwest, sometimes living for many months as wild birds. No records of even short migrations similar to this one have come to the writer's attention. It seems regrettable that the too well known urge common with humans to shoot any big bird, has so abruptly terminated what might have been a most interesting experiment.—LAWRENCE E. HICKS, *Ohio State University, Columbus, Ohio.*

Whistling Swans.—In 1921 during the late hunting season, a lad brought in what he called a big Gray Goose weighing about thirteen pounds. It proved to be a juvenile Whistling Swan and was one of a flock of five birds. Shooting the Swan was contrary to law but the boy was unaware of the identity of the bird. Later he reported that although the bird had been baked for four or five hours, it made very tough eating.

On December 30, 1934, a hunter wading through Lima Lake, near Quincy, Illinois, came upon a dead Whistling Swan that had been shot by some ruthless hunter. Another, probably the mate, was shot by a native who lived nearby and who crawled through the swamp grass and shot the bird which he carried home for food. These are the only positive records of Swans in this locality recently, although several rumors of small flocks have come to me during the last several years.—T. E. MUSSELMAN, *Quincy, Illinois.*

Snow Geese (*Chen hyperborea*) near Washington, D. C.—While in search of early Warblers and other migrants with Wendell Taber at noon on April 19, 1935, our attention was suddenly drawn skywards. We had driven over Chain Bridge, a few miles up the Potomac River from Washington and had climbed the height of land rising above the Virginia end of the bridge. It was in the midst of a pine grove topping the hill that we gazed upwards and discovered a flock of Snow Geese in somewhat loose wedge formation, to the number of eighteen or twenty, winging their way steadily westward following the river, at an altitude, we estimated, of seven hundred feet. In the brief space of time ere the flock passed from view, no honking was audible. Strongly contrasting were the white bodies and black wing tips. One could only guess as to which subspecies they belonged.—AARON C. BAGG, *Holyoke, Mass.*

Another Blue Goose from Georgia.—Dr. Eugene Edmund Murphey, of Augusta, Ga., has kindly given me permission to record another Blue Goose (*Chen caerulescens*) from this state. This specimen, an adult male, taken Nov. 20, 1920, is now in Dr. Murphey's collection. It was taken at Axon, Atkinson County, and antedates by nearly fourteen years the one I recorded in the January issue of 'The Auk,' page 78.—IVAN R. TOMKINS, *U. S. Dredge Morgan, Savannah, Ga.*

The Oldsquaw in the Interior of Alabama.—So far as I can ascertain there are only three records of the Oldsquaw in Alabama, and they are all from the Gulf

Coast region. On January 25, 1935, I saw a bird of this species, presumably a female or an immature, on Lake Purdy, near Birmingham. It appeared predominantly gray and white (rather than brown and white) and lacked the long tail of the adult male. There was a small patch of fuscous behind and slightly below the eye, and all the top of the head was fuscous. The back, wings, and tail were practically the same color, but there was a small, squarish, white patch on each wing. Especially noticeable, however, was its short, upturned, blackish bill, with its pinkish band in the middle, differentiating it from any other Duck with which I am acquainted. I had always thought of the Oldsquaw as a rather wild bird, but such was decidedly not the case with this individual. It performed its diving operations within eight feet of the shore, as I examined it with 8x glasses alternately lying and sitting almost at the water's edge. However, another black-and-white Duck, which I saw near the same spot on February 22 and which I suspect of being the same species if not the same individual, was much wilder, and I could see it only as it flew across the water several hundred yards away.—HENRY M. STEVENSON, 7759 1st Ave. So., Birmingham, Ala.

Ducks in Chimneys.—While at Lost River, New Hampshire, during the summer of 1934, I received from Mrs. Gardner Rogers an adult female American Merganser (*Mergus merganser americanus*) which had died under most unusual circumstances. On Monday, June 25, 1934, Mrs. Rogers entered a room in her Asquam Lake camp at Ashland, New Hampshire. This room had been cleaned and closed up the previous Saturday. To her astonishment she found the bird in question resting with legs stretched wide apart on a table beside a window. It was noticeably weak and appeared somewhat dazed. It was easily captured but died within a few minutes. A hurried inspection of the room to find how it had gained admittance revealed a few feathers inside the fireplace and the screen before it pushed out from one side. Apparently this hollow-tree-nesting Duck had made the fatal mistake of coming down the chimney in search of a suitable nesting site. Dr. Witmer Stone tells me of a similar case of a Wood Duck (*Aix sponsa*) which came down a chimney in the vicinity of Philadelphia, during the past spring, and stopped up the flue. Upon investigation its dead body was found, completely covered with soot.—OLIN SEWALL PETTINGILL, JR., Middleton, Mass.

Black Vultures in Indiana.—On November 12, 1934, while riding along the eastern edge of Clifty Ravine, near Madison, Indiana, I was astonished to see, on the opposite wall of the cliff, a large number of Vultures sunning themselves among the rocks and shelters there. Most of them were perched upon rocks and trees, some with wings outspread in characteristic Vulture way. Some were flying. I estimated there were a hundred and fifty birds in sight. At least three fourths of them were Black Vultures (*Coragyps atratus atratus*), locally known as "Carion Crows," the remainder were Turkey Vultures (*Cathartes aura septentrionalis*). I do not know of any place in this region where so many of these birds congregate. In fact, there is great lack of information concerning the first mentioned species in the Ohio Valley. Audubon's account seems to have been the only one for many years. Few of the early writers mention it. In the opinion of many persons these birds had disappeared as the country was settled. Perhaps investigation will show that view to have been wrong.

Inquiry shows that McKim Copeland, reported Black Vultures wintering in large numbers in Jefferson County, Indiana, and notes that about a hundred and fifty made their headquarters in Clifty Falls State Park the winter of 1926-7. A few stay

through the summer and nest. They were reported to number from a hundred and fifty to five hundred in different winters. Miss Edna Banta, who was a nature guide in the park for three summers, states that they were common in winter of 1927-8, and that in March they began to scatter. A pair nested in the jumble of rocks at Tunnel Falls each of the three summers she was there and she saw young learning to fly. About two years ago (1932) they were shot at, by park officials, to drive them away. Then the C. C. C. Camp was located nearby and now one does not see so many of them. S. E. Eaton, on the staff of the State Conservation Department, observed numbers of Vultures there in winter and estimated ninety per cent were Black Vultures. John C. Kirkpatrick makes a similar report. He says these birds were first noted in Jefferson County about ten years ago (1925) near Rikers Ridge. In 1931 they were abundant in Clifty Falls, State Park, roosting in winter under the ledges along "dead man's trail," but in summer they were not common. A nest was seen among a pile of rocks near the falls in 1933 and several young in the park early in September.

From Clarke County Mrs. Genevieve B. Myers records them from Jeffersonville September 1, 1934, and S. E. Perkins III from Charleston, October 23, 1932.

C. W. Brown notes several at Vevay, Switzerland County, the winter of 1933-4 and has seen them the past winter. December 6, 1934, he saw nine at one time. Several persons reported them in Posey County the past few years. The counties mentioned border the Ohio River.

Roy Chansler records having seen them in Knox County in 1930 and 1933. Prof. W. P. Allyn informs me he found a pair nesting six miles south of Manhattan, Putnam County, in 1933. He photographed the nest. Charles K. Muchmore, Laurel, Indiana, says January 8, 1935, he found a company of twenty-two Black Vultures in the center of a wooded tract lying between the old canal and the White Water River about two miles south of that town. The evidence showed they had been using that place for a roost for some time. They were there January 28, 1935.

From the evidence now before us it appears that Black Vultures range north in Indiana to about the old National Road—Fayette and Putnam counties. They occasionally breed throughout that territory and associated with Turkey Vultures gather in winter in some quiet, protected places—sometimes in large numbers.—AMOS W. BUTLER, *Indianapolis, Indiana.*

An Exhausted Sharp-shinned Hawk.—Early in the forenoon of May 11, 1922, in a small sloop, sailing on the course from Pemaquid Point to Eastern Egg Rock in Muscongus Bay, Maine, and quartering against a strong northwesterly wind, when about half way between these two points, we saw a Sharp-shinned Hawk coming toward us. As it was coming before the wind it quickly came up, and dropped astern, wheeled into the wind, followed, and attempted to alight on the end of our boom, within a few feet of the helmsman. It was evident that it was exhausted, probably having made a long flight against a head wind, before attempting the open stretch of the Bay. As the bird hovered for its coveted perch, the boat lurched, and the bird missing its hold fell into the water, where it rested with out-stretched wings, making no attempt to rise. We came about as quickly as possible, and ran back for the unfortunate bird, but as we came near, it made a supreme effort and aided by the strong breeze, rose from the water, and as soon as it could master its flight, again started for our boom; again it missed its intended perch, struck the leech of the sail, and slid down into the cockpit, where it was seized before it could regain the use of its weary wings. We tacked and again started on our course to windward. In a few seconds the bird made one of its spasmodic efforts and escaped. It now started before

the wind for the shore about a mile and a quarter distant, but it made but a short flight when it again fell into the sea, where it probably perished.—ARTHUR H. NORTON, *Museum of Natural History, Portland, Maine.*

Northern Bald Eagle: an Addition to the New Hampshire List.—It has been suspected for several years that Eagles wintering on the coast of New Hampshire were of a different form from the birds present inland at other seasons. While a series of measurements to substantiate this cannot easily be obtained, and since Mr. Luman R. Nelson who has handled both forms, assures me the wintering birds are larger as well as darker, I wish to submit the following notes:

On January 26, 1934, from a group of ten immature and adult Eagles at Great Bay, Portsmouth, N. H., Mr. Nelson collected two immature birds of the form *Haliaeetus leucocephalus alascanus*. Both were preserved by him and repose in his bird museum at Winchester. The larger of the two birds measured eight feet four inches from tip to tip wing-spread and weighed twelve pounds; bill, two and three-fourths inches; folded wing, twenty-seven inches. The second bird averaged a little smaller. One stomach was empty; the other contained parts of a Black Duck.

On January 15, 1935, Mr. Nelson collected, also at Great Bay where these birds winter each year, a third Northern Bald Eagle; a beautiful, very dark male. In structure it proved to be larger than any of the few adult females of the common form in his collection; it weighed ten and one-half pounds, and the stomach was empty. The bill measured a little over two and one-half inches; folded wing, twenty-four inches.—LEWIS O. SHELLEY, *East Westmoreland, N. H.*

Notes on the Black Pigeon Hawk.—Two recently published notes concerning the Black Pigeon Hawk (*Falco columbarius suckleyi*) by Dr. G. M. Sutton (Auk, Vol. LII, Jan. 1935, page 79) and H. S. Swarth, (Condor, Vol. XXXVI, Jan.-Feb. 1934, page 40) would seem to indicate that my own notes and observations regarding this little known race may be worth recording. First, in regard to the validity of the race: "I know of no proof," says Mr. Swarth, "that the name (*F. c. suckleyi*) represents a valid, geographic race, confined within boundaries to the exclusion of other forms of *columbarius*. Most assuredly it is not of the humid coastal strip, as has been supposed. I have collected specimens of "*suckleyi*" at Hazelton and at Atlin, south-bound migrants all; it must breed somewhere in this general region, where, however typical *columbarius* also occurs."

In regard to the taking of an adult male in breeding condition at Blue River, B. C., Dr. Sutton concludes: "Our capture of this breeding bird so far inland forces us to believe that *suckleyi* is not restricted to the coastal region in summer, as has heretofore been supposed; and strengthens our conviction that the adult male taken by Taverner at Oliver, in the southern Okanagan Valley, on June 10, 1922, was not far from its nesting grounds, even though we are plainly told that this was 'not a breeding bird' (see Brooks and Swarth, l. c.)."

In the last fifteen years I have observed or taken Pigeon Hawks in the west coast region from Portland, Oregon, to the Chitina River, Alaska, and eastward in British Columbia to the Similkameen and Okanagan valleys. A breeding pair with a family from which young specimens were taken, on the Chitina headwaters—close to the Yukon-Alaska line—proved to be the eastern form, *Falco columbarius columbarius*. Birds observed at Portland, Oregon, in winter—one at very close quarters—were almost certainly juveniles of the dark form, *F. c. suckleyi*, or at least not the eastern form. Mr. Stanley G. Jewett, of Portland, Oregon informs me that of seven Black Pigeon Hawks in his collection, only one is from east of the Cascades,—this an

immature male taken July 31, 1929, at Heppner, Oregon, by H. W. Dobyns. Two are from coastal Oregon or Washington, two from Comox, Vancouver Island. In the Similkameen and Okanagan valleys of British Columbia I have taken during autumn migration both *columbarius* and *suckleyi* juveniles. In regard to the Taverner specimen of the adult male, mentioned above by Sutton, I stood on the other side of the tree when the bird was shot and a few years later, August 31, 1928, on the same mountain (Anarchist) some few miles distant near its southern end, took a juvenile of the same race.

In the last thirteen years on Vancouver Island mainly in the Comox region I have collected twenty-three Pigeon Hawks, the dates of taking being scattered over most of the year. Of these, two males and two females have been adult, the balance juveniles, and of this number only one is of a paler, doubtful form not typical of either race here under discussion. The others have been of the black race, supposedly *F. c. suckleyi*. In addition to the above there must be another dozen Vancouver Island specimens of this bird in other British Columbian collections taken mainly at Comox.

As this black form of the species has been observed or taken on Vancouver Island in every month of the year; as it undoubtedly breeds here; as the early migrant autumn birds are mainly juveniles and the wintering birds more apt to be adult; as the young of the year are out in the open in the last week of July; and as the eastern form *F. c. columbarius* is found on Vancouver Island only as a rarity of migration, turning up as a score of other eastern birds do, surely there is enough evidence at hand to warrant that this black form of Pigeon Hawk is a valid geographic race with a range of its own and that range, if not centering about Vancouver Island, is at least in the coastal strip. As in four summers' field work—six months each year afield—in southern British Columbia between Vancouver City and the Rockies, including ten weeks observation in Jasper Park, Alta, and five weeks in the Lake Louise area in the Rockies, I neither took nor saw any Pigeon Hawks, it would seem that the Okanagan specimens, of which there are several, and the Blue River bird mark approximately the eastern limits, and the Atlin specimens are close to the northern extremity of the range—Blue River being almost due north of the southern Okanagan and Atlin at no great distance from the Chitina headwaters. The fact that a Black Pigeon Hawk turns up occasionally in the interior of British Columbia or even in eastern Canada in the undoubted range of *F. c. columbarius* surely can mean little more than the fact of *columbarius* coming to Vancouver Island.

A bird with gonads in breeding condition by no means proves the case of actual nesting; but conceding the Blue River male breeding and even for the sake of the argument, the Taverner male also, too much must not be taken for granted from such outpost records. It is vastly more difficult to secure Pigeon Hawks at breeding time out of the heavy timber of the coastal belt than to get them in the interior country where the timber is not only lower but the woods more open. Coastal birds are often sighted on perches quite out of gunshot and I have had to kill a number with a small-bore rifle. That some birds of a coastal race extend its range into the interior beyond the Coast Range is not surprising; but the wilderness interior of Vancouver Island and the whole coastal area of British Columbia from Vancouver City northward is a region practically unworked by ornithologists. A glance at the map will show its intricate system of inlets, channels and islands. It is all heavily forested, the most difficult sort of country for field work. This undoubtedly is the home range of the elusive little Black Merlin.

That it can be found actually breeding here by anyone who cares to spend the effort on the problem, I have no doubt. On May 10, 1926, in the suburbs of the city

of Vancouver I noted a Black Pigeon Hawk carrying something in its feet that I judged to be nesting material. Twice at least in June and July, on Vancouver Island, I have heard the shrill cry of the little male—in one case I saw him also—and judged the bird close to its nest site. In both cases these birds were in heavy timber inland, the most difficult country in which to locate a nest. This plainly accounts for its scarcity in mid-summer and relative abundance in late July and August when the young come out of hiding. At nesting time (June and July) when it is relatively seldom seen, it evidently retires to its original natural habitat—the dense forest, and emerges in July and August when the burns and slashings and cultivated fields provide abundant small bird prey.

The life story of the Black Merlin would seem to offer in small edition a wondrously exact parallel to that of the Black Duck Hawk (*Falco peregrinus pealei*)—a similarity that holds good not only in plumage but in habits of life, range, manner of taking prey, migration, wintering and nesting. From the above I think it can be seen that the Black Merlin would seem to be a good enough race and that its home range is the "humid coastal strip" from which not even a few outpost records will remove it.—HAMILTON M. LAING, *Comox, British Columbia*.

Albinism Among New Hampshire Ring-necked Pheasants.—On October 3, 1934, Mr. Luman R. Nelson collected in Winchester, N. H., a full-sized albino male Ring-necked Pheasant (*Phasianus colchicus torquatus*) from a flock of seven albino birds. All seven birds were young-of-the-year from normal colored parents; the brood was hatched near, and lived about the Country Club grounds, where they lingered at least part of the winter, with the adults often accompanying them.

While their color was white throughout, the legs and feet, and bill were colored a light shade of buff; the eyes were the normal brown color, I was given to understand, and such eyes were used in the mounted specimen. The wattles and bare places of the head were an intense red.—LEWIS O. SHELLEY, *East Westmoreland, N. H.*

Does the Female Woodcock Ever Sky Dance?—Some years ago I recorded (Auk, Vol. XLVII, No. 2, p. 248) observations on the American Woodcock (*Philohela minor*) in West Virginia. Since that time we have had rather exceptional opportunities for studying the habits of this bird, and have been very much puzzled by one observation.

Several times observers near French Creek, Upshur County, W. Va., have noted that more Woodcocks seemed to be in the air than were giving the usual "peents" from the ground. It appeared that two distinct series of whistling notes could be heard during the sky dances, where, apparently, only one male was calling on the ground.

On the evening of April 19, 1935, Mrs. Brooks and the writer were looking for Woodcocks near French Creek just at dusk. In a nearby ravine we had already heard a number of "peents." Suddenly quite close at hand we heard the whistle of wings at the take-off for a sky dance, and we both saw very distinctly *two* birds rising together, starting their circles, and then we caught glimpses of them again, still together, as they circled over our heads during the flight. When the musical notes which precede descent were given we could not tell that more than one bird was giving them, but the descent was too far away for us to be sure that both birds came down in unison. Of course it is quite possible that these were two males which happened to fly at the same time, but there were no evidences on the ground to this effect. It naturally occurred to us that we had perhaps seen a female going through the sky dance procedure.

Forbush (Birds of Massachusetts and Other New England States: Vol. 1, p. 388) records an observation on the flight of a presumed female during the sky dance of the male, but states that no whistling of wings could be heard as she flew. It is common observation, however, that the female is capable of making these whistling sounds during flight, and we are certain that both the birds we observed were making these notes.

We have noted many times that Woodcocks give a vocal warning just before they start their sky dance flights. This consists of a much shortened "peent," given at a close interval after the last regular note on the ground, and followed almost immediately by the flight. Attempts were made to measure the width of the circles made during sky dance flights, observers being on opposite ridges to note the birds in the air. Where only a single bird was sky dancing it was fairly easy to mark these circles, and we concluded that they were sometimes at least four hundred yards in diameter.

Another characteristic noted is that the point of departure from the ground is not usually in the center of the flight circle, but is rather apt to be located near the outer circumference. The song notes that come before the descent are not given over the point of alighting, but to one side of it. Several times we have noticed that birds were regularly alighting near light-colored rocks; this suggesting that a land-mark might be used in again locating the point from which flight was made.

Ordinarily sky dancing is done only at dusk and early morning, but during times of bright moonlight it continues as long as the moon is unobscured. Mr. A. B. Brooks and the writer noted during the spring of 1934 that when heavy clouds crossed the face of the moon sky dancing stopped, to be resumed immediately after the clouds had passed.

On April 27, 1930, "peent" notes were heard, and a single sky dance noted when the temperature was standing at 30° F. My father and I had an unusual experience on March 26, 1930. As we were walking along a trail near French Creek, we noticed the tracks of a bird in a rather heavy snow which had fallen the night before. Following back on these tracks, we came to the nest of a Woodcock completely surrounded with snow. The old bird was on the nest sheltering four eggs. This was the only time I have ever tracked a bird to its nest through the snow.—MAURICE BROOKS, *Dept. of Biology, West Virginia University, Morgantown, W. Va.*

Second Recorded Nesting of the Laughing Gull on the South Carolina Coast.—On May 15, 1935, the writer, in company with a small party visited the Cape Romain Federal Migratory Bird Refuge with its Superintendent, Mr. H. F. West. While investigating a small reef known as the White Bank, on which were numbers of nesting Oyster-catchers, Willets and a large colony of Louisiana and Snowy Herons, three pairs of Laughing Gulls were seen. Recalling that this spot was the site of the first breeding record of this species in the state (Auk, vol. L, 360) we looked carefully for nests and were successful in finding three, one for each of the pairs seen. One nest held two eggs, the other two one each. One was built out in the open on oyster shells, the other two were slightly sheltered by wips of salt-water myrtle (*Baccharis* sp.). No other material other than sedge stems was used.

The nest which constituted the first record in 1933, was broken up by Crows, and it is doubtful whether the exposed nest found recently will survive. That the Laughing Gull is beginning to nest regularly now in South Carolina seems certain. During all of Mr. A. T. Wayne's nearly fifty years in the field in this state, he never saw a nest, and White Bank is in Bull's Bay, a region often visited by him. Another peculiarity in the White Bank area is that the Louisiana and Snowy Herons are

nesting there nearly two miles from the mainland. They are building on the ground itself and in very low salt-water myrtle bushes less than two feet high. The nests numbered 411, of which about 70 were those of the Snowy Heron. The young were just hatching.—ALEXANDER SPRUNT, JR., R. F. D. No. 1, Charleston, S. C.

A Flight of Common Terns at Harrisburg, Pa.—Common Terns (*Sterna hirundo hirundo*) are only occasionally seen during migration on the Susquehanna River at Harrisburg, and then only in small numbers. Daily observations along the river revealed no Common Terns during 1935 until May 3. Upon that day within a half hour I saw four or five flocks of over fifty each, the next day only one, and none on subsequent days with frequent observation. Evidently the Terns made a concerted flight and were gone. The first flock of 67 was flying low up the river when suddenly the bird began to ascend and made three complete circles within a quarter of a mile, somewhat as Homing Pigeons circle, but always gaining altitude until at perhaps 500 feet they disappeared into the north. The other groups rested on the water or flew to and from a low grassy isle, making it somewhat difficult to count their exact number. With them on the sand spit were a few Herring Gulls (*Larus argentatus smithsonianus*) and three Black Terns (*Chlidonias nigra surinamensis*). The Terns did not fly erratically up and down the river, or alight and drift, repeatedly, without getting anywhere, as I have seen Bonaparte Gulls (*Larus philadelphia*) do here.—HAROLD B. WOOD, Harrisburg, Pa.

The Noddy at Charleston, South Carolina.—The Noddy (*Anous stolidus*) is of accidental occurrence in South Carolina, its two occurrences following West Indian storms. However, an appearance unconnected with any atmospheric abnormality has lately come to the writer's notice.

On June 16, 1929 three Noddies were seen on a piece of driftwood at the entrance of Charleston Harbor by Allan D. Cruickshank of New York City, as he was proceeding north by steamer, the weather being normal. The birds floated by at close range and were seen to advantage by unaided eye-sight and through 10x binoculars. The writer is indebted to Mr. Cruickshank for the above information.—ALEXANDER SPRUNT, JR., R. F. D. No. 1, Charleston, S. C.

Additional Dovekie Weights.—When Murphey and Vogt published their article, "The Dovekie Influx of 1932" (Auk; Vol. L, No. 3) they had only one weight (see page 345) which was known to be from a bird in normal condition. I now wish to submit a record of the weights of seven additional birds taken under normal wintering conditions at Harrington Harbor, Sag Co. Quebec, during the winter of 1934-35. These weights were recorded by Mr. Donald Osborne who was trained as my assistant during the summer of 1934. The weights, recorded in grams, are as follows: 188; 180; 180; 162; 159; 158; 146. It appears from these that the individual birds normally vary considerably in weight, which, according to my experience, is true of the Alcidae. My Nova Scotia specimen taken in 1932, as reported, weighed 127 grams although it possessed a considerable layer of sub-cutaneous fat.—R. A. JOHNSON, State Normal School, Oneonta, N. Y.

Early Nesting of the Great Horned Owl.—On January 20, 1935, I found a Great Horned Owl (*Bubo v. virginianus*) incubating the first egg of its clutch. The nest was in the crotch of a red oak, fifty-five feet from the ground, in the University of Wisconsin arboretum at Madison. Later two more eggs were laid, the first egg hatching on February 27. I photographed the nest on this date and on March 25 and on April 1, the young were banded—662548-550. On the two latter occasions

the female bird clawed me before the young were replaced in the nest. Our earliest previous record for the nesting of the Great Horned Owl is February 11.—WILLIAM H. ELDER, 217 Clifford Court, Madison, Wisconsin.

Snowy Owl Migration—1934-1935.—There has been another marked migration of Snowy Owls (*Nyctea nyctea*) into Quebec, the Maritime Provinces and New England during the past winter 1934-1935. Each year Snowy Owls are reported in this region but periodically there appear an unusual number, constituting great flights which have been found to correspond with the fluctuations in the numbers of other forms of life especially with the rodents such as the Lemming of the far north.

These flights, according to the records that have been compiled in the past, occur about every four years. The cycle has been noted to have a correspondence to the periods of the maximum numbers of Arctic Foxes and other fur bearing animals which also depend on Lemmings as one of their chief sources of food.²

Judging from the reports that I have received, the migration this year has been concentrated in the region of the Province of Quebec and New England. Correspondence reveals that few Snowy Owls, compared with the numbers of the two previous migrations of 1926-1927¹ and 1930-1931,² were seen along the Atlantic seaboard south of New York.

Dr. D. A. Dery of Quebec, P. Q. states that in addition to the very large numbers of Snowy Owls there was also an unusual number of Gray Owls, Hawk Owls and Long-eared Owls observed in the Province of Quebec this year.

The greater number of Snowy Owls reported in New England were seen during the latter part of October and November, 1934, but not infrequent records have been received throughout the winter. One individual has been seen in the vicinity of Back Bay, Portland until March, 1935.

It is of importance, especially to those interested in the study of animal cycles and periodic migrations, to have on record the present migration of 1934-1935. Therefore additional records especially of Snowy Owls observed south of New England and New York during the past winter will be greatly appreciated.—ALFRED O. GROSS, Bowdoin College, Brunswick, Maine.

The Yellow-bellied Sapsucker and the Ruby-throated Hummingbird as Commensals.—The interesting observation recorded under a similar title in the April 'Auk' by Mr. Freer and Dr. Murray is not unique. An account of this habit of the Ruby-throated Hummingbird (*Archilochus colubris*) of feeding from holes drilled by Sapsuckers was given by Frank Bolles in 'The Auk' (July, 1891, pp. 256-270), under the title of 'Yellow-bellied Woodpeckers and their Uninvited Guests.' The paper was reprinted as 'Sapsuckers and their Guests' in Bolles's book 'From Blomidon to Smoky' (1894), which also contains further notes on the subject in a chapter entitled 'The Humming-birds of Chocorua,' reprinted from the 'Popular Science Monthly.' Frank Bolles's three books of nature essays are all too little known today. They are delightful reading, besides containing much good ornithology.—FRANCIS H. ALLEN, West Roxbury, Mass.

Migrational Dates of Purple Martins.—At Harrisburg, Pa., a 28-compartment Martin house was erected in 1922 on one of the main streets in front of the E. Z. Gross Drugstore at 110 Market St. Daily observations are made of this bird house

¹ Gross, A. O. 1927. The Snowy Owl Migration of 1926-27, Auk, vol. 44, No. 4, p. 479-493.

² Gross, A. O. 1931. Snowy Owl Migration 1930-1931, Auk, vol. 48, No. 4, p. 501-511.

by the proprietor and his employees, and migrational records have been preserved by them. From 1925 to 1935, inclusive, the spring arrival dates of the Purple Martins (*Progne subis subis*) at this bird house were, in order, April 6, 3, 12, 5, 4, 6, March 26, April 1, 7, 13. Some personal observations approximately confirm these drugstore dates. Also, although I saw Purple Martins forty miles further north several days before, I know they had not arrived at the city house by April 17, in 1935. The dates of fall departure have been kept for the past four years only. They were July 25, 1931, August 4, 1932, August 1, 1933 and August 30, 1934. The times for beginning of migration may depend upon local conditions at the point of departure but these few fall dates bear no relation whatever to the local variations in temperature or rainfall. None of these Martins was banded.—HAROLD B. WOOD, Harrisburg, Pa.

Ravens in the Kittatinny Ridge of Pennsylvania.—I was much interested in R. S. Freer's notes in the last issue of 'The Auk,' relating to the unsuspected population of Ravens (*Corvus corax principalis*) in a portion of the Virginia Blue Ridge. The numerous ranges of the Blue Ridge may harbor more of these birds than we are wont to suppose.

Running to the northeastward, the Blue Ridge merges into the Kittatinny Ridge. "Hawk Mountain," near Dreher'sville, is roughly two hundred miles from the area mentioned by Freer. In the course of my duties protecting the Hawks at the mountain during the fall of 1934, I saw two Ravens. It is possible that they may have been the same individual. The first bird occurred on October 14, at 4.37 P. M.; the next on November 2, at 4 P. M. On both occasions the birds passed close to the observation rocks, and on a level with my position. They followed the mountain as did the southward bound Hawks. Earle L. Poole of the Reading Public Museum informed me that Ravens are rare in this region, the last seen in Berks County being some forty years ago.—MAURICE BROWN, Orleans, Cape Cod, Mass.

Eastern Hermit Thrush (*Hylocichla guttata faxoni*) in Song in Florida.—On three memorable occasions in New England I have heard migrating Hermit Thrushes in song. That members of this species should exercise their vocal powers in the South, however, in violation of all known precepts of Turdine behavior, nearly borders on the incredible. (Howell, in his 'Florida Bird Life' says of the Hermit Thrush ". . . this charming songster is never heard in the South.").

About one P. M. on March 6, 1935, I was taken by surprise to hear the clear cadences of a Hermit Thrush, at the southern end of Apopka Lake, in Citrus County. Although the bird sang for about five minutes, its notes were never so full as when heard in the North. Three days later, in the early forenoon, I again had the good fortune to hear, and to see, this unusual songster. This time the song was even richer, and continued for more than ten minutes. On four more occasions, up to March 21, I was regaled with this bird's music. I have assumed that one bird was responsible for this unprecedented behavior, inasmuch as I saw a single Hermit Thrush about our cottage during this period.

On April 1, while botanizing in the woods adjacent to Buzzard's Roost, seven miles west of Gainesville, I paused to hear once again, a Hermit Thrush singing with marvelous fullness and clarity.—MAURICE BROWN, Orleans, Cape Cod, Mass.

Blue-gray Gnatcatcher at Cambridge, Mass.—On May 14 a Mrs. Sampson directed me to a bird she could not identify in Mount Auburn Cemetery, Cambridge, Mass., which bird turned out to be a Blue-gray Gnatcatcher (*Poliophtila c. caerulea*). It allowed an approach to within five feet, and even without my 12x glasses the blue

upper parts, dark tail with white outer feathers, gray lores, black line over the eye, and gray-edged wing feathers showed plainly. It sang its full song once, and continually called with its characteristic notes. On the 15th many members of the Harvard Ornithological Club and the Nuttall Club saw the bird, which appears to be staying.—FRED M. PACKARD, *Kirkland House, Cambridge, Mass.*

A New Bird for Idaho.—On October 7, 1932, I took an immature female Western Gnatcatcher (*Poliophtila caerulea amoenissima*) at 6000 feet elevation near the mouth of Sheep Creek, about eight miles southwest of Raymond, Bear Lake County, Idaho. The specimen is now in the University of Michigan Museum of Zoology. This is a new bird for the Idaho list and seems to be quite an extension northward in the range of the subspecies.—PIERCE BRODKORB, *Museum of Zoology, Ann Arbor, Mich.*

Notes on Breeding Success of Starlings.—During May and June of 1933 and 1934 a number of Starling (*Sturnus v. vulgaris*) nests located in an old barn on an abandoned farm near Oneonta, N. Y., were observed with the idea of recording the result of their attempt to produce a crop of young. Records were made of the number of eggs produced, the number of young hatched, and the number of young fledged in those nests accessible during the time allotted to the study.

There were two nesting periods each year: the first during the month of May, and the second during June. The second nests appeared all within ten days of the same date which was from one to two weeks after the first broods had left the nests. Since none of the adult birds were banded there is no proof that these late nests were the work of the same adults as those which produced the early nests, but, since they were in most cases created by relining the earlier nest, I believe that the same adults were nesting a second time. Plenty of new nest sites were available for any late nesting adults.

Notes were recorded on the success of seventeen nests. Six of these were early or May nests of 1933 and 1934. Eleven were second or June nests of 1933. All of these second nests came at the time of the beginning of the drought of 1933.

The seventeen nests produced seventy-nine eggs, hatched fifty young, forty of which were reared. It is very interesting however to compare the success of the early or May nests with the late or June nests. The six early nests produced twenty-nine eggs, hatched twenty-six young and fledged twenty-six young. The eleven late or June nests produced fifty eggs, hatched twenty-four young, of which only fourteen were fledged. During the incubation period for the June nests the severe drought of that summer set in, which was, in my opinion, the main factor in causing the low percentage of success for the second nests.

With fifteen pairs of adult nesting birds known to be located in this building, and two others in tree cavities nearby, a total of thirty-four adults were competing for food in the same area. Old meadows of timothy, redtop, and hawkweed with a few roadside and orchard trees form the vegetative cover. When the June drought became noticeable in the drying up of the meadows the result on the nesting birds appeared in the loss of eggs as well as of young after hatching.

Careful examination was made of the nests and young for blood sucking parasites. None was found.

It may possibly appear that for central New York the May nesting date is well adapted to the peak of food supply. This meagre report however does help show the need for extensive data from many workers in different parts of the country if we are to record something regarding the manner in which this new species is becoming adapted.—R. A. JOHNSON, *State Normal School, Oneonta, N. Y.*

European Starling Nesting at Savannah, Georgia.—The occurrence of the Starling (*Sturnus v. vulgaris*) at Savannah came under my observation for the first time on November 18, 1927, when I found the birds scattered rather commonly through the vacant lots in the extreme southern residential section of the city, but it was not until the spring of 1934 that evidence of the nesting of the species was obtained. On May 1, a Starling was seen to enter an abandoned hole of a Woodpecker near the top of a power line pole, where its arrival was announced by the harsh, rasping cries of young birds. The nestlings emitted an almost continuous series of cries but with the departure of the adult these suddenly ceased. Within the course of half an hour, the young were fed five times, and on each occasion the adult remained in the nesting cavity about thirty seconds before emerging. Unfortunately it was impossible to make daily observations at the nest site, and unwise to attempt a climb through the network of high tension wires, so that neither nest nor young birds were actually seen.

Nevertheless, it would seem that the evidence so far presented is sufficient to warrant the recognition of the species as breeding in Chatham County.—W. J. ERICHSEN, 2301 Whitaker St., Savannah, Ga.

Nesting of the Starling (*Sturnus vulgaris vulgaris*) in the Labrador Peninsula.—The following notes are published as a contribution to the record of the extension of the range of the Starling in North America.

On June 16, 1934, I saw three Starlings enter three different holes in the boarding of a large storehouse for dried fish, the property of Robin Jones & Whitman Limited, situated near the wharf at Natashquan, Saguenay County, Quebec. I heard no sound of young birds in the walls of the building. It was in the immediate vicinity of this building that I saw a Starling on June 17, 1933.¹ Natashquan is on the south coast of the Labrador Peninsula, in Lat. 50° 12' N., Long. 61° 50' W.

Mr. P. C. Camiot, manager of the above firm and a native of the Island of Jersey, Channel Islands, where he had become familiar with Starlings in his youth, furnished me, in interviews on June 16, July 30, and August 4, 1934, with the following information about Starlings at Natashquan.

Starlings nested at Natashquan, in cavities in the walls of the storehouse mentioned, in June and July, 1933. Mr. Camiot first became aware of their presence there when, while working within the building, he heard the cries of the young in the walls. He thought that there were three nests of Starlings in the building at one time in 1933, but is not sure if any of the young were successful in leaving the nest. He saw no Starlings about Natashquan between the time when the cries of the young in the nest ceased and the following spring and therefore does not think that this species raised a second brood of young at Natashquan in 1933 or that it remained there during the winter of 1933–34.

Mr. Camiot observed three pairs of Starlings at Natashquan in the spring of 1934, before nesting began. He thinks that these three pairs nested there but that two of the nests were unsuccessful either because they were robbed of eggs or because they were disturbed so much that they were abandoned.

The young birds left one nest successfully on July 22, 1934. For a few days immediately thereafter they returned to the nest each night, then for several days no Starlings were observed in the vicinity. Both adults and young returned to the vicinity of the nest on July 31 and again on August 3.—HARRISON F. LEWIS, *Canadian Nat. Parks, Ottawa, Canada.*

¹ Auk, 51: 89.

The Alaska Yellow Warbler in Kansas.—While examining the series of Yellow Warblers in the University of Kansas Museum of Birds and Mammals, I noticed three specimens which seemed to belong to the race *Dendroica aestiva rubiginosa* the Alaska Yellow Warbler. These skins were sent to Dr. Alexander Wetmore, who has confirmed the identification.

This race is probably a rare, but regular migrant through Kansas, although it has not previously been reported from the state. It has been taken many times in various neighboring states, and seems to cover a wide range of territory during migration. The three Kansas specimens were all taken in Douglas County, as follows:

KU 10857 ♀ May 22, 1919, by C. D. Bunker.

KU 11775 ♀ May 7, 1921, by J. Linsdale.

KU 12267 ♂ May 13, 1922, by H. Malleis.

I am greatly indebted to Mr. C. D. Bunker, Assistant Curator in charge of the Museum of Birds and Mammals, for permission to report this record.—W. S. LONG, *Museum of Birds and Mammals, Lawrence, Kansas.*

Bay-breasted Warbler in Arkansas.—On April 24, 1935, while checking migrants, it was our good fortune to observe a Bay-breasted Warbler (*Dendroica castanea*), three miles south of Monticello. It was observed again on May 1, 2 and 11. As far as we can ascertain this species has not been previously reported from this state.—CHAS. M. OWENS, *Monticello, Arkansas.*

Scarlet Tanager on the Coast of Georgia.—On April 29, 1922, while walking along a gravelled roadway near the ocean beach at Tybee Island, Chatham County, Georgia, Thos. D. Burleigh and I came upon a boy who had just shot an adult male Scarlet Tanager (*Piranga erythromelas*). The specimen was examined by us, but was not preserved.

Although this species is a common summer resident in the high mountains of northern Georgia, it is of extremely accidental occurrence in the coast region of the state.—W. J. ERICHSEN, *2301 Whitaker St., Savannah, Ga.*

An Abnormally Plumaged Cardinal.—From July 2 to August 16, 1934, at the invitation of the Cranbrook Institute of Science, I studied the birds of the Edwin S. George Wild Life Reserve, a 1200-Acre, well-fenced tract situated not far from Pinckney, Livingston County, Michigan. On July 17, I collected a breeding male Cardinal (*Richmondia c. cardinalis*), which apparently had not altogether completed the post-juvenal molt. The plumage of this specimen (University of Michigan Museum of Zoology No. 74978) is largely normal, the beak is bright orange-red as in the full adult, and the skull is firm and granulated; but many feathers of the auricular region, the back, the scapulars, and the chest and sides are distinctly brown or buffy-brown, and not red; and one of the longest of the under tail-coverts is not only buffy rather than red, but it is distinctly more plumulaceous than any other feather of the region. That the bird was breeding there can be no doubt, for it was in full song and the gonads each measured approximately 4.5 x 5.5 mm.

The Cardinal is known to have a complete post-juvenal molt in late summer and fall. There is no pre-nuptial molt in late winter or spring. How, then, may we account for these buffy, juvenal feathers in the plumage of an individual that appears to be fully grown? Have they been held through an entire winter and spring as a result of some failure of the molting dropping-out process, or has the individual

reached sexual maturity at an abnormally early age? It is perhaps significant that only one of the ten rectrices present is new and unworn, and this feather is fully 8 mm. longer than any other rectrix. Notable, too, is the fact that two or three distal primary coverts in each wing are brown and worn whereas the other primary coverts are new and red. Further study of the molts and sequence of plumages in this species may show us that such a condition as I have just described often is characteristic of birds in their first breeding season, but I have not found a comparably part-colored individual in the considerable number of male Cardinals I have examined.—GEORGE MIKSCH SUTTON, *Laboratory of Ornithology, Cornell University, Ithaca, New York*.

Clay-colored Sparrow in New York.—On April 28, 1935, I took a Clay-colored Sparrow (*Spizella pallida*) at Ithaca, New York. It was discovered feeding along a path beside Fall Creek and was still there forty minutes later, despite the presence within less than one hundred feet of several persons in their back yards. It proved to be a male with enlarged testes. The bird was prepared by Miss A. Marguerite Heydweiller for the Cornell University collection, and though badly shot, it made a good skin. This is an addition to the avifauna of New York State.—ALLAN R. PHILLIPS, *Cornell University, Ithaca, New York*.

An Atlantic Song Sparrow from Georgia.—A bird picked up dead January 15, 1935, about two miles east of Savannah, proves to be typical of the pale Song Sparrow (*Melospiza melodia atlantica*) of the Atlantic coastal islands. Mr. Arthur H. Howell identified the bird.

This seems to be the first record for the state, and the first to be taken south of Charleston, S. C.—IVAN R. TOMKINS, *U. S. Dredge Morgan, Savannah, Ga.*

The Lapland Longspur (*Calcarius l. lapponicus*); A South Carolina Specimen, and a Georgia Sight Record.—On April 20, 1935, I collected a male of this species on Long Island Fill, S. C., Messrs. G. R. Rossignol and W. J. Erichson being present.

On March 24, on Oysterbed Island, Ga., about a mile to the eastward, I had seen one, and possibly two, of these birds. One I had examined quite closely at a satisfactory distance, in good light, and in several different positions, and as it so obviously was of the same species, I am not so reluctant to offer the sight record, as I might have been before taking the South Carolina bird.

There appear to be no records for the South Atlantic States, except of the bird taken by Loomis at Chester, S. C., on January 1, 1881, and recorded by him (Auk, II, 1885, 190).—IVAN R. TOMKINS, *U. S. Dredge Morgan, Savannah, Ga.*

Lapland Longspur on the Central East Coast of Florida.—On January 29, 1934, Mr. W. E. Shannon, who has camped for several months on Merritts Island, Brevard County, Florida, shot a Lapland Longspur (*Calcarius lapponicus lapponicus*) near the settlement of Wilson, seven or eight miles east of Titusville. The bird was first seen on January 23. Shannon observed that it did not hop like a Sparrow, but walked like a Horned Lark, which he at first mistook it to be. When the bird was found again on the 29th about 300 yards from the place it was first seen, he borrowed a gun and collected it. On both occasions the Longspur was found feeding in a sand road.

Shannon writes that he flushed the bird several times before collecting it and that each time it circled around, "uttering a little warbling song," and alighted again in the ruts of the road.

Mr. Arthur H. Howell, of the U. S. Biological Survey, informs me that this is the first record of a Longspur of any kind for Florida.

Had the bird been found in the northwestern part of the state, the occurrence would be less surprising, but the appearance of a seemingly lone bird of this normally gregarious species at a point far down the east coast of the peninsula is not easy to account for. At the time the bird was first noted the whole of the northern United States was in the grip of the most severe siege of frigid weather in years. The temperature in the Dakotas and Minnesota dropped as low as 45° below zero on the 22d and 23rd, and here at Jacksonville there was a sudden decline from 73° on the former date to 30° on the latter, with the first measurable snowfall in 35 years.

At Titusville on January 23, the day the Longspur was first observed, the minimum temperature was 52°. The following day the minimum was 32°, and each night until the 28th the temperature dropped into the thirties.

At Mr. Howell's suggestion the specimen has been deposited in the collection of the National Museum.—S. A. GRIMES, 4661 Attleboro St., Jacksonville, Fla.

Some Unusual Records from Aroostook County, Maine, 1934.—*Nycticorax nycticorax hoaccli*. BLACK-CROWNED NIGHT HERON.—Mr. A. H. Norton, Portland Society of Natural History, informs me that, although the A. O. U. 'Check-List' (4th ed.) gives southern Quebec as the northern limit of the breeding range of this species, inland stations are few in Maine and that this colony should be recorded. It is a small colony, consisting of about twenty-five or thirty pairs. The station is located in a dense, almost solid growth of spruces on a rather steep hill facing the west and the Aroostook River, about one mile north of the town of Fort Fairfield. The nests are from forty to fifty feet up, near the tops of the trees, and are composed of sticks and twigs. Banding operations were attempted in late June, when most of the young were still in the nests. The difficulties of climbing these spruces were, to our mind, very great and banding was abandoned after four trees were climbed, since we succeeded in merely forcing the birds to step leisurely to the next tree; a maneuver, unfortunately, denied to us. A farm hand working nearby assured us that the colony had been there as long as he had, i. e. fifteen years.

Anas platyrhynchos platyrhynchos. COMMON MALLARD.—A pair of this species was observed by a group of four from a distance of thirty feet, on Mud Pond, near Ashland, on May 26, 1934. A return trip to the same locality did not result in our seeing the birds again. They were in company with four of the following species.

Nyroca collaris. RING-NECKED DUCK.—Four were observed on Mud Pond, near Ashland, May 26, 1934. On the following day a return trip resulted in a better view of the birds and the ringed bill was observed by all four members of the party, as was also the white "crescent" in front of the wing.

Lophodytes cucullatus. HOODED MERGANSER.—In early October, 1934, three were seen and one collected, about three miles up the Presque Isle Stream, near the town of Presque Isle.

Oxyechus vociferus vociferus. KILLDEER.—Although two or three records each summer have been obtained in recent years, the spring of 1934 gave us our first spring record, on April 29, 1934, near Presque Isle.

Capella delicata. WILSON'S SNIPE.—A Snipe, seen on March 5, 1934, was reported to me and verified as Wilson's, on March 13. This bird usually does not arrive until early May although we have one record for April 19, (1933). On the above date (March 13) the bird was feeding in an open stream near the outskirts of the town of Presque Isle and was observed by passers-by for several days following verification. At the time there were three feet of snow everywhere else near town. Following a

period of sub-zero weather the bird was seen no more. Inasmuch as the winter of 1933-34 was of unusual severity this early appearance seems noteworthy.

Pisobia minutilla. LEAST SANDPIPER.—On May 26, 1934, two were observed at close range (four or five feet, almost underfoot) on the mud flats of the Aroostook River, near Presque Isle.

Anthus spinoletta rubescens. AMERICAN PIPIT.—A flock of fifteen was seen on the mud flats mentioned above, near Presque Isle, on May 13, 1934. They allowed rather close approach and identification was unmistakable. This same territory was covered all during the spring migration, this year as in others, but the birds were not seen again.—G. D. CHAMBERLAIN, *High School, Presque Island, Me.*

Notes on the Winter Bird Life of the Delaware Coast.—The following notes were taken during a trip of two days duration to Sussex County, Delaware, in company with Arthur H. Howell and Allan J. Duvall, January 4 and 5, 1935. During the first day, which was clear and cold, with a brisk northwest wind, activities were confined to the beach south of Cape Henlopen, in the vicinity of Lewes, and on the following day to the sand dunes between Rehoboth Beach and Bethany Beach, under conditions reminiscent of early spring rather than of midwinter. Little has apparently been published on the bird life of this stretch of the Atlantic Coast at this season of the year, so although admittedly fragmentary these records may be of interest.

Lanius ludovicianus migrans. MIGRANT SHRIKE.—Two birds, widely separated, were seen near Milford, one on January 4, the other on the following day. There would seem to be few winter records for this subspecies in this region.

Passerculus princeps. IPSWICH SPARROW.—This species was one of the special objectives of the trip, so it was a source of considerable gratification to us to find it actually plentiful on this stretch of coast. At least 20 individuals, possibly more, were seen near Rehoboth Beach in the course of an hour, and brief pauses later in the day between this point and Bethany Beach never failed to reveal the presence of one or more of these birds. They proved less shy than we had anticipated, for on being flushed from the sparse grass they would almost invariably fly to the nearest clump of myrtle bushes and, perching in full view on an uppermost twig, would permit a close approach before dropping back to the ground.

Passerculus sandwichensis savanna. EASTERN SAVANNAH SPARROW.—Apparently scarce during the winter months, for at only one spot, near the ocean south of Rehoboth Beach, was one small flock noted. A specimen taken was clearly referable to this race.

Melospiza melodia melodia. EASTERN SONG SPARROW.—Surprisingly few Song Sparrows were seen, and these were so timid that it was only with difficulty that several were collected. They proved to be the darker race occurring during the breeding season well back from the coast, and not the gray form, *atlantica*, which we had expected to find in such a situation as this. It is possible that *atlantica* winters this far north, but judging from this limited experience, certainly not in any numbers.

Plectrophenax nivalis nivalis. EASTERN SNOW BUNTING.—At first glimpse the beach at Cape Henlopen seemed lifeless, but within a few minutes of our arrival small flocks of Snow Buntings appeared from the south, moving with an apparent objective toward the Cape. There they gathered on the side of a dune until approximately 150 individuals were present, when they flew out over the bay in a compact flock in the general direction of Cape May, New Jersey. One would hardly expect these birds to be migrating north early in January, so an explanation of this sight might be the effect of the relatively mild weather on this boreal species. It would be

of interest to know whether lower temperatures and snow would possibly witness their return to this stretch of coast until conditions modified again.—THOS. D. BURLEIGH, Bureau of Biological Survey, Washington, D. C.

Winter Notes from Coastal North Carolina.—The avifauna of coastal North Carolina is of more than ordinary interest in that it frequently represents the southern limit of northern species and the northern limit of southern forms. A recent trip to the coastal region of that state revealed an increased concentration of a number of species of normal occurrence and it also showed a few uncommon or rare winter visitors.

We ordinarily think of the Loon (*Gavia immer*) as being more or less a solitary bird, both in flight and on the wintering grounds. In coastal North Carolina, however, where these birds probably have always been common as winter visitors or migrants, they occasionally group together in loose scattered flocks. On January 13, near the boundary of Pamlico and Core Sounds, upwards of 1,000 Loons were seen in the air at one time. All were headed northwest. Most of the birds flew past our boat singly or in loose groupings up to 20 individuals. I was much surprised when two large loose and uncoordinated flocks streamed past, one containing 104 birds and the other 130. Such numbers seem to indicate that as a result of protection this species has increased. Over other portions of Pamlico Sound unusual numbers were not seen. I did not ascertain the cause of the concentration at this locality, or why all were flying in about the same direction, or the destination they were seeking.

Tremendous numbers of the Double-crested Cormorants (*Phalacrocorax a. auritus*) frequent the southern part of the Sound. They are vigorously condemned by fishermen, who claim that they enter their pound-nets and prey upon valuable fish. Because the birds are diurnal in their feeding habits, the fishermen are compelled to be at their nets by the break of day. It is felt that these birds have increased slightly during the past few years.

Perhaps it should be mentioned that concurrently with the dying out of the eel grass, the Brant (*Branta b. hrota*) have been alarmingly reduced in numbers along the east coast and particularly in Pamlico Sound, and it is doubtful whether there were more than 2 per cent of the numbers of Brant in this area in January 1935 that were there in the same month of 1930. Most other species of waterfowl also were comparatively scarce although proportionately more abundant than Brant. Of the Ducks, the White-winged Scoter (*Melanitta deglandi*) perhaps showed the greatest decrease over preceding years.

In a recent number of 'The Auk' (vol. 50, p. 353, 1933), I reported the first two authentic records of the Blue Goose (*Chen caerulescens*) occurring in North Carolina. On January 15, 1935, in company with U. S. Game Management Agent Wm. Birch, I observed 6 of these birds in a flock of about 2,000 Snow Geese (*Chen hyperborea* subsp.). During the gunning season other Blue Geese were seen and one was collected on Mattamuskeet Lake. Available data indicate a general increase of this species.

In the 'Birds of North Carolina' by Pearson, Brimley and Brimley, the authors give no winter record of the Willet (*Catoptrophorus s. semipalmatus*). A flock of four birds was observed at unusually close range with 8-power binoculars on the beach at Ocracoke Island.

The occurrence of several hundred Sanderlings (*Crocethia alba*) and Red-backed Sandpipers (*Pelidna a. sakhalina*) in a single flock indicates an increase of these birds over numbers seen on visits to this same area in previous years. In addition to the above species, a small number of Black-bellied Plover (*Squatarola squatarola*), d dy Turnstones (*Arenaria i. morinella*), Oyster-catchers (*Haematopus palliatus*),

and Greater Yellow-legs (*Totanus melanoleucus*) were observed on one or more of the islands bordering Pamlico Sound. The last-named species, however, are not common winter visitors, although they occur regularly in small numbers.

During each of the past four winters a progressive increase of Gulls has been noted. Until the past few years the Great Black-backed Gull (*Larus marinus*) has occurred only as a casual visitor south of Delaware Bay. During five days spent in the Pamlico Sound area more than 50 of these birds were observed. More than 30 were seen in one afternoon between Cape Hatteras and Rodanthe on Hatteras Island. Thirteen of these were in one flock.

Two Terns were observed at Swanquarter and 2 near Portsmouth, yet they did not come within gunshot and I could not collect a specimen. While they were regarded as the Common Terns (*Sterna h. hirundo*), they may have been Forster's (*S. forsteri*).

Five records of the Razor-billed Auk (*Alca torda*) are known for North Carolina. On January 16, 1935, at Pea Island, one individual of this species, covered with oil, was picked up on the beach. An effort was made to clean the feathers and bring the bird to the National Zoological Park, but it died in transit.

While Tree Swallows (*Iridoprocne bicolor*) are known to winter sparingly along the coast of the state, it was somewhat surprising to see 30 of these birds in the air at one time on January 18. They were observed at a number of places, but were most common in the Swanquarter Migratory Bird Refuge. In this same area 2 Maryland Yellow-throats (*Geothlypis trichas* subsp.) were seen.—CLARENCE COTTAM, Bureau of Biological Survey, Washington, D. C.

Interesting Winter Notes at Lake Mattamuskeet Wild Life Refuge (Hyde County, N. C.).—*Casmerodius albus egretta*. AMERICAN EGRET.—Although several birds were observed in October and November about the lake it appears likely that only one remained during the winter, an individual being seen on January 3 and on January 7, 1935.

Branta bernicla hrota. AMERICAN BRANT.—As this species has become rather scarce except in certain localities along the Atlantic seaboard, I take this occasion to record one bird here on January 9, and three birds on January 22, 1935.

Chen hyperborea allantica. GREATER SNOW GOOSE.—Another form which has become rather scarce except in certain sections. Three birds flew up from the lake with a flock of Canada Geese on November 27, 1934; two birds seen on December 4, 1934; one bird seen flying with and on the waters of the lake with Canada Geese on January 21, 1935; one bird seen by W. G. Cahoon and J. B. Hodges flying over New Holland Inn on March 17, 1935.

Chen caerulescens. BLUE GOOSE.—Records for this form are always of interest along the Atlantic coast and I give the following:—October 30, 1934 one bird flying with a flock of Whistling Swans; November 9, 1934 six birds seen by Mr. James Silver and Mr. Joe Mann; November 20, 1934 seven birds in one flock, apparently all in adult plumage; January 9, 1935 one bird flying with Whistling Swans for some distance; March 13, 1935 two birds on the lake recorded by Mrs. Wm. F. Atkinson.

Falco columbarius columbarius. PIGEON HAWK.—As this Falcon is supposed to winter further south it is well to record one here on December 25, 1934.

Gallinula chloropus cachinnans. FLORIDA GALLINULE.—On January 7, 1935 a bird was seen by the Goose pen which it struck against in efforts to get away. This date may establish this form as a permanent resident to some extent in this coastal strip.

Plectrophenax nivalis nivalis. SNOW BUNTING.—All records of this bird in the south are of interest so I give the following:—One bird on December 3, 1934, allowing

a very close approach; one bird (possibly the same individual) on January 7, 1935 near the same place.—EARLE R. GREENE, *New Holland, N. C.*

Notes on Some Unusual Birds in Florida.—During the past winter I spent a part of each day (November 19, 1934 to April 1, 1935) afield in various parts of Florida. My observations covered 155 species and subspecies of birds, of which the following seemed noteworthy.

Gavia stellata. RED-THROATED LOON.—On December 30 I saw a Red-throated Loon between Islamorada and Metacumbe, of the upper Florida Keys. Again on January 13 my wife and I studied a bird of this species in Biscayne Bay. It was swimming close to the causeway which connects Little River with Miami Beach. Howell, in his 'Florida Bird Life' (page 74) gives the status of this species in Florida as uncommon in winter, and cites R. H. Howe's specimen at Lemon City (winter of 1899) as the most southerly record in that State.

Ictinia mississippiensis. MISSISSIPPI KITE.—For upwards of quarter of an hour during the mid-afternoon of December 28, I watched an adult of this species as it circled over the Tamiami Trail, about fifty miles west of Miami. Howell's data include six previous winter records for the state.

Buteo brachyurus. SHORT-TAILED HAWK.—I saw three specimens on February 4. The first, a splendid bird in dark plumage, was also seen by Mrs. E. Peterson and Mrs. Mary Lott, both of Miami. We came upon the bird in the forenoon, between Florida City and Card Sound, and studied it at some length as it sailed and circled over the highway, once only thirty feet or so off the ground. The bird was moving slowly northward. About an hour later I saw two more Short-tails, one in the dark and the other in the light phase, over the upper end of Key Largo, and these birds were also headed north.

Falco peregrinus anatum. DUCK HAWK.—On December 30 I saw an adult of this species at Tavernier.

Larus marinus. GREAT BLACK-BACKED GULL.—While driving through the upper Florida Keys on February 4, accompanied by the ladies mentioned above, two immature specimens of this Gull came to our attention. The birds were five or six miles apart, associating with Herring and Laughing Gulls that made up small flocks on sandy beaches, just before reaching the Metacumbe ferry. The Black-backs were studied at very close range; their husky build, heavy beaks and very brown backs distinguishing them from their companions instantly. So far as I know this record represents the southernmost appearance of the species on the Atlantic coast.

Gelochelidon nilotica aranea. GULL-BILLED TERN.—On November 19 I saw two birds resting on Jacksonville Beach, in company with a small flock of Royal Terns.

Tyrannus verticalis. ARKANSAS KINGBIRD.—Howell lists eight occurrences of this species, all dating from 1918. An Arkansas Kingbird which I saw on February 23, on the Tamiami Trail about forty miles west of Miami, permitted me a full twenty minutes of observation. Once the bird disappeared for a moment in some undergrowth beside a ditch. When it regained its perch on a telephone wire, I was amazed to see a small frog clamped in its bill, and dispatched quickly!

Vermivora leucobronchialis. BREWSTER'S WARBLER.—In the early morning of November 21 I was concealed in a weedy patch of farm land bordering Biscayne Canal, seven miles north of Miami, attracting numerous small birds to me by means of whistling and squeaking. Suddenly, in the tall "dog fennel" within five feet of me, exposing itself to full view, appeared a beautiful specimen of this hybrid Warbler. The bird's curiosity led it to remain barely long enough for me to recognize it as a

fairly typical *leucobronchialis*. The bright yellow crown, distinct black line through the eye, and yellow washing on the breast extending slightly down the bird's flanks, impressed themselves most forcibly on my mind.

While I have had no previous field experience with the Brewster's Warbler, a number of years ago I had occasion to make an intensive study of several series of skins of both *leucobronchialis* and *lawrencei*, the details of which study appeared in my history and discussion of the hybrids in Forbush's 'Birds of Massachusetts,' Vol. III.

Seiurus motacilla. LOUISIANA WATER-THRUSH.—Howell gives the status of this species in Florida as "casual in winter," and cites its presence during the winter of 1910 at Eau Gallie. I studied two individuals under very favorable circumstances at Royal Palm State Park, Dade County, in the early morning of January 18. The birds were feeding within thirty feet of me, along the border of the ditch which parallels the highway on the east side of the park. I have had a good deal of experience with this Water-Thrush at its various breeding localities in Connecticut and Massachusetts.

Passerina cyanea. INDIGO BUNTING.—Records of Indigo Buntings wintering in Florida are so meager that I am tempted to add the following, of two females observed seven miles north of Miami, on January 4.

Chondestes grammacus grammacus. EASTERN LARK SPARROW.—Of the nine instances of the occurrence of Lark Sparrows in Florida, given by Howell, two only are of wintering birds, and none are reported for the Miami region. In the late afternoon of December 9 I came upon a pair of these birds at the eastern end of Gratigny Highway, eight miles north of Miami. The birds were very tame. Upon being followed up they flew but a few yards to the top of a scrub oak from which they were studied advantageously. Again on December 20 I found this pair, in exactly the same place. On two subsequent visits I failed to find them.—MAURICE BROWN, Orleans, Cape Cod, Mass.

Additional Notes on Ohio Birds.—*Tympanuchus cupido americanus*. GREATER PRAIRIE CHICKEN.—Fifty years ago the Prairie Chicken was still present in some of the prairie areas of western and northwestern Ohio. By 1900 the species was virtually, if not actually extirpated in this state, as it was not reported by observers for many years. Recently, Ohio game protectors and others have reported seeing individuals of this species in some of the Ohio counties bordering Michigan. Apparently these birds are invaders from southern Michigan, where the species is not uncommon in restricted localities. During the early fall of 1934, Game Protector A. D. Meagley found a Prairie Chicken on a road near Bowling Green, Wood County, that had obviously been killed by an automobile. This bird is now mounted and in the collection of the Ohio Division of Conservation.

During the late summer of 1933 a few young and adult Prairie Chickens, originally from Wisconsin, were released by the Ohio Division of Conservation on one of the largest original prairies of Ohio, in Marion County west of the city of Marion. Since then Game Protector O. H. Neimeyer and I have seen one or more of these birds on two occasions, the last time on December 31, 1934; and Mr. Neimeyer reports having seen four young birds of the year during the summer of 1934. Whether this species will again establish itself in Ohio remains to be seen.

Phalaropus fulicarius. RED PHALAROPE.—This species is probably not as rare an Ohio bird as was formerly supposed, for during the past nine years I have collected three individuals. The records of these birds, which were taken on September 29,

1927,¹ November 2, 1929² and October 28, 1933, tend to indicate that the species may be a late fall straggler through Ohio. The October 28 specimen has not been recorded. It was collected by me as it swam and fed on the open water near Liebs Island in the western half of Buckeye Lake in Fairfield County. This specimen is in the Ohio State Museum (No. 6568).

Lobipes lobatus. NORTHERN PHALAROPE.—Apparently this species is not as rare in Ohio as has generally been supposed. In 1933, at least, it was not extremely rare, for it was noted several times that year: on September 10, 1933, I collected a female of this species at Buckeye Lake, in Licking County (this specimen is No. 3984 in the Ohio State Museum); Mr. Lawrence E. Hicks³ recorded one from central Ohio; Mr. Louis W. Campbell, Mr. Bernard R. Campbell and I noted three individuals, accompanied by two Wilson Phalaropes, in the Little Cedar Point Marsh, Lucas County, on September 3, 1933; and two observers recorded them from northeastern Ohio. The Campbell brothers inform me that, since 1926, they have seen this species at the western end of Lake Erie in Ohio on at least seven occasions.

Larus marinus. GREAT BLACK-BACKED GULL.—This species is quite rare in central Ohio. At Buckeye Lake on November 19, 1933, Mr. Harry Fabert and I, with the aid of a 30x telescope, for more than an hour observed an individual of this species in what was probably the second winter plumage. Throughout the period of observation the bird remained on the ice beside an open hole, enabling us to repeatedly note the characteristic markings of the immature Black-backed Gull: the dusky and dark brown mottled back, much dusker than any Herring or Ring-billed Gull; the whitish head, neck and underparts, and the huge bill and head. In fact, the greater size of this individual and the comparatively larger head, when compared with the Herring Gulls with which it associated, were very marked.

Telmatodytes palustris dissaepius. PRAIRIE MARSH WREN.—A single individual remained throughout the entire winter of 1932-1933 at Buckeye Lake in Licking County. It was found in a group of cattails not more than 125 yards long by 10 yards wide, upon every occasion when looked for. It is therefore assumed that the bird spent most if not all of the winter in this small area. This individual was apparently a male, for it began to sing in early April.

Agelaius phoeniceus arciolegus. GIANT RED-WING.—Three individuals of this subspecies of Red-wing have been taken in central Ohio in recent years. The dates, localities and Ohio State Museum numbers are: October 28, 1927, Licking County, 3095; January 2, 1933, Licking County, 6647; January 2, 1933, Licking County, 6642.

Acanthis linaria rostrata. GREATER REDPOLL.—On February 11, 1934, in company with Mr. Louis W. Campbell, Mr. Bernard R. Campbell and Mr. Lawrence Hiett, I collected four Redpolls in Jerusalem Township, Lucas County. Comparing these specimens with the large series of Redpolls in the Museum of Zoology, of the University of Michigan, Dr. Josselyn Van Tyne and I found that two (Ohio State Museum Nos. 6621 and 6622) were referable to *A. linaria rostrata* while the other two (O. S. M. 6619 and 6620) were *A. linaria linaria*. To my knowledge the two specimens of *A. linaria rostrata* are the first to be recorded for Ohio. These four birds were probably part of a large flock of some 125 individuals which remained at this locality during the greater part of the 1933-1934 winter.⁴

Poocetes gramineus gramineus. EASTERN VESPER SPARROW.—Since there appears to be no published record of the Vesper Sparrow wintering in central Ohio, it may be

¹ Hile, Auk, XLV, 94.

² Trautman and Walker, Auk, XLVII, 250-251.

³ Hicks, Auk, LI, 82.

⁴ Campbell and Campbell, Wilson, Bull., XLVI, 122-123.

recorded that one of these birds was noted several times throughout the 1933-1934 winter, at the Urbana State Game Farm, Salem Township, Champaign County. It was always found in the vicinity of a trash burner about which considerable chick feed had been thrown. Since this Sparrow, when observed, was usually feeding upon the waste grain, it is quite possible that this food supply was one of the reasons for its wintering here.

Zonotrichia leucophrys gambeli. GAMBEL'S SPARROW.—This subspecies may occur in Ohio more frequently than was formerly supposed, for at least three specimens have been collected since 1928. The first of these three specimens, an immature female, was taken by me on October 13, 1928, in Fairfield County near Buckeye Lake. The second, an adult male, was taken by Mr. Paul A. Stewart on May 8, 1933, near Leetonia, Columbiana County. The capture of this bird was recorded in 'The Auk'.¹ The third specimen, an immature male, was taken by Mr. Louis W. Campbell and Mr. Bernard R. Campbell, on October 21, 1933, in Waterville Township, Lucas County. The identifications of the Fairfield County bird (Ohio State Museum, 3485) and the Lucas County bird (O. S. M. 6639) were recently confirmed by Dr. H. C. Oberholser. The record of the Lucas County bird is being published here at the request of the Campbell brothers.—MILTON B. TRAUTMAN, *Museum of Zoology, University of Michigan*.

Shore Birds at Madison, Wisconsin.—*Charadrius melodus*. PIPING PLOVER.—On April 29, 1934, while walking along the northern shore of Lake Kegonsa with my son Jack and a young friend, Karl Leopold, I saw a small Plover near the water's edge, so much the color of the sand over which it ran that the instant it stopped it vanished from sight. Closer inspection showed it to be a Piping Plover in nuptial plumage, and with complete neck ring,—which, according to Mr. Bent, probably indicated an old bird. The customary autopsy proved it to be a male. This species has for many years been rare anywhere in the interior of the state, this being the first record for Dane County.

Pluvialis dominica dominica. AMERICAN GOLDEN PLOVER.—On October 26, 1934, I visited a small lake a dozen miles east of Madison. Normally the lake is about a mile and a quarter around, though now much reduced. The borders for the most part slope very gradually so that a slight drop in the water level means a long recession of the shore line, and when this occurs there is left exposed a wide mud flat that soon becomes caked by the sun. The lake had then reached its lowest level in over 30 years, but it is interesting to know that in 1900 it was completely dried up, with corn growing over a large portion. On the present occasion as I approached the shore I saw 26 Golden Plover standing in the shallow water, all facing toward me. They were very quiet. Now and then one would lower or turn its head and occasionally one would fly a few yards but for the most part there was little movement. About a fourth of the birds had a very definite whitish stripe over the eye and white forehead. I have an idea that these were adults and the others juveniles, a belief considerably strengthened by the fact that one of the flock which was captured alive under peculiar circumstances belonged to the larger class and was a juvenile. If this supposition is correct it would contravene the opinion advanced by Dr. T. S. Roberts that in the southward migration through the interior the adults precede the young of the year.

This is the second record for the county, the first being that of three birds shot from a flock by a hunter in the fall of 1927, one of which is preserved.—JOHN S. MAIN, *Madison, Wis.*

¹ Stewart, Auk, L, 443-444.

Some Notes from Arkansas.—*Gavia immer immer*. COMMON LOON.—I collected one in Lee County, on the St. Francis River, Sept. 9, 1932. It was swimming within a hundred yards of my house-boat and allowed me to approach within shooting distance in a skiff. The bird was alone.

Gavia stellata. RED-THROATED LOON.—Seen by Pindar in Poinsett County in 1888-89. I saw a fisherman shoot one in Phillips County near the mouth of the St. Francis River, November 5, 1933. It was in the water near some Cormorants. The skin was preserved.

Sterna hirundo hirundo. COMMON TERN.—Apparently not reported from Arkansas. A single specimen was seen and collected in Lee County on the St. Francis River, October 3, 1933.

Hydroprogne caspia imperator. CASPIAN TERN.—Apparently not reported from this state. While standing on the deck of the house-boat on the St. Francis River in Lee County, two Caspian Terns were seen nearing and were being chased by Swallows (Rough-winged?). One of the Terns seized a Swallow in its beak and flew with it for some distance. I bagged both the Terns, a male and a female.

Pisobia melanotos. PECTORAL SANDPIPER.—Reported from Poinsett County in 1888-89 and from Arkansas City, May 15, 1910. I killed a female on Lake Hamilton in Garland County, May 12, 1935. It was in a mixed flock containing White-rumped and Least Sandpipers.

Pisobia fuscicollis. WHITE-RUMPED SANDPIPER.—No previous report from this state known to me. I took a male on Lake Hamilton in Garland County, May 12, 1935. This specimen and a Semipalmated were killed by a single discharge.

Ereunetes pusillus. SEMIPALMATED SANDPIPER.—Reported from Texarkana, December, 1924. I collected a specimen on a sand-bar in the St. Francis River in Lee County, September 15, 1932. When I recorded them as "numerous." I killed a male on Lake Hamilton in Garland County, May 12, 1935, and a third, a female, the following day only a short distance away. On the 12th, these birds were mixed in a flock of Least Sandpipers, and on the 13th were feeding with Least and other Sandpipers unidentified.

Vireo philadelphicus. PHILADELPHIA VIREO.—One specimen, a spring migrant, was reported from Winalow. I collected one on Larkin's Lake in Lee County, September 23, 1932.

Sitta canadensis. RED-BREASTED NUTHATCH.—Reported from Poinsett County, 1888-89 and from Helena in 1895. I saw one hopping over the trunk of a large oak in my back yard in Hot Springs, March 31, 1934. I am not over-confident in my sight records, especially of rarities, but the tree was so close to my window that with 8x binoculars it was as though it were a bird in the hand.

Dendroica fusca. BLACKBURNIAN WARBLER.—Reported from Chicot, October 4, 1920. I shot a male specimen on Bull Bayou, Garland County, May 7, 1935.

Dendroica striata. BLACK-POLL WARBLER.—Reported from Helena, Turrell, Rich Mountain and Fayetteville. I collected a female in Garland County, May 11, 1935.—WM. H. DEADERICK, 36 Circle Drive, Hot Springs, Ark.

New Bird Records from Texas.—The following field notes relate to two birds that are new to the state of Texas, and to the finding of the first Texas nest of a third species. They are apparently of sufficient interest at the present time to be worthy of publication:

Micropallas whitneyi whitneyi. ELF OWL.—A female of this species was captured alive at her nest in the Lower Juniper Canyon of the Chisos Mountains, Texas, May 21, 1934. On the same day she laid an egg in the cage in which she was confined.

This seems to be the first record of the Elf Owl in the Big Bend region, although the species has, of course, been reported from the Lower Rio Grande Valley in Texas. Doctor Harry C. Oberholser has determined this specimen to belong to the typical Arizona form of the species, which, so far as we are aware, is new to the state of Texas.

Cynanthus latirostris. BROAD-BILLED HUMMINGBIRD.—A nest of this species containing two eggs was found on May 17, 1934, at Talley's (Johnson's) Ranch, on the Rio Grande, southwest of Mariscal Mountain, Brewster County, Texas. The nest was on the very bank of the Rio Grande, on a drooping twig in a triple fork of a small willow tree some ten or twelve feet above the ground on a steep bank of the river and almost overhung the water. The nest was composed almost entirely of the down of willows ornamented on the outside with yellow blooms and tiny mesquite leaves and bound with spider or insect webs. The materials of the nest lashed it firmly to the twigs on which it rested in an upright fork. This nest is a beautiful structure and agrees entirely with a nest of this species in the United States National Museum. The female was under observation for a considerable period at close range, and her mostly red bill and conspicuous white streak on the side of her head, combined with the other coloration, made the identification positive. The red-billed, green-plumaged male was seen not very far away, although he did not actually visit the nest. While neither the male nor the female of this nest was collected, they were both seen so many times at such close range and their diagnostic characters so well observed, that these features, taken together with the characteristic nest, leave no doubt of correct identification.

Calamospiza melanocorys. LARK BUNTING.—While this species is known to summer in Texas, there is, so far as we are aware, no record of the actual finding of the nest within the state. Therefore, it was with a very great deal of pleasure that we discovered two nests of this bird some two miles west of El Dorado, in Schleicher County, Texas, May 24, 1931, thus extending the breeding range of the species for a long distance southward from the Texas Panhandle. One of the nests contained six eggs and the other five. Each female was flushed from the nest and was soon joined by the male, so that it was possible easily and fully to make identification. Each of the nests was on the ground in a shallow hollow, its rim about an inch and one-half above the ground. Each was placed in the center of an open clump of acacia a few inches high growing in a level meadow that was dotted with similar bushes.—ROY W. QUILLIN, *San Antonio, Texas*.

Some Notes from the Panama Canal Zone—Summer 1934.—Noting a serious gap in the recorded ornithological observations in the Panama Canal Zone region, during the months of July and August, the writers spent this part of the summer of 1934 in an intensive study of the bird-life of the varied ecological areas that comprise this interesting field.

During our stay we used the popular and commendable 'Field-guide' by Bertha B. Sturgis which we found to be a valuable complement to the necessary volumes of Ridgway's 'Birds of North and Middle America.' We observed 264 species, among which were several not included in Sturgis. These are listed below, as well as migration dates, notations on nesting, and data on distribution in summer for comparison with the dry season observations which predominate in the Sturgis 'Guide.'

(1) Additions to the Sturgis list. With two exceptions no previous records have been found.

Micropalama himantopus. STILT SANDPIPER.

Crocethia alba. SANDERLING.

Steganopus tricolor. WILSON'S PHALAROPE.

Polyborus cheriway (*cheriway*?). AUDUBON'S CARACARA.—Common at Tapia. Omitted by Sturgis.

Gelochelidon nilotica aranea. GULL-BILLED TERN.

Fluvicola pica. WHITE-SHOULDERED WATER-TYRANT.

Mimus polyglottos (*leucopterus*?). WESTERN MOCKINGBIRD.—We were informed that these birds were introduced from California several years ago. They are breeding and have spread.

Vireolanius pulchellus viridiceps. PANAMA SHRIKE VIREO.—Common. Omitted from Sturgis.

(2) North American migrants were recorded as follows.

Squatarola squatarola. BLACK-BELLIED PLOVER.—August 28, three, Panama Vieja.

Pagolla wilsonia beldingi. BELDING'S PLOVER.—August 7 and 28, several, Panama Vieja; also Gatun, August 23, twenty one.

Charadrius semipalmatus. SEMIPALMATED PLOVER.—August 7 and 28, common, Panama Vieja; Gatun, August 30–September 1, one.

Arenaria interpres morinella. RUDDY TURNSTONE.—August 28, Panama Vieja, three.

Numenius hudsonicus. HUDSONIAN CURLEW.—August 28, Panama Vieja, five.

Micropalama himantopus. STILT SANDPIPER.—August 22–26, Gatun, two.

Totanus melanoleucus. GREATER YELLOW-LEGS.—August 12–26, Gatun; August 28, Panama Vieja.

Totanus flavipes. LESSER YELLOW-LEGS.—August 5–September 1, Gatun; August 28, Panama Vieja.

Catoptrophorus semipalmatus (*subs?*). WILLET.—August 7 and 28, Panama Vieja.

Tringa solitaria solitaria. EASTERN SOLITARY SANDPIPER.—August 15–September 1, Gatun; August 29, Rio Tapia.

Actitis macularia. SPOTTED SANDPIPER.—August 5–September 1, Gatun, abundant.

Bartramia longicauda. UPLAND PLOVER.—August 17, 1933, Gatun, one.

Ereunetes pusillus. SEMIPALMATED SANDPIPER.—August 5 to August 30, Gatun, several, Aug. 7 and 28, Panama Vieja.

Ereunetes mauri. WESTERN SANDPIPER.—August 7 and 28, Panama Vieja.

Pisobia minutilla. LEAST SANDPIPER.—August 7 and 28, Panama Vieja.

Pisobia maculata. PECTORAL SANDPIPER.—August 30 and September 1, Gatun.

Crocethia alba. SANDERLING.—August 8, Gatun, one; also August 7, 1933.

Steganopus tricolor. WILSON'S PHALAROPE.—August 22 to August 26, Gatun, one.

Larus atricilla. LAUGHING GULL.—August 28, Panama Vieja, a dozen.

Larus franklini. FRANKLIN'S GULL.—August 13, 1933, Panama Vieja.

Sterna mazima. ROYAL TERN.—First date, August 1, uncommon, Gatun, Barro Colorado, Pedro Miguel.

Gelochelidon nilotica aranea. GULL-BILLED TERN.—August 28, Panama Vieja, one.

Hydrochelidon nigra surinamensis. BLACK TERN.—August 23, Gatun, not uncommon during following week.

Pandion haliaetus carolinensis. OSPREY.—August 6, first date, Gatun.

Tyrannus tyrannus. EASTERN KINGBIRD.—August 29, Rio Tapia, two.

Riparia riparia. BANK SWALLOW.—August 26, Gatun, later not uncommon.

Hirundo erythrogaster. BARN SWALLOW.—August 14, Gatun, very common.

Petrochelidon lunifrons tachina. LESSER CLIFF SWALLOW.—August 21, Madden Dam, Gatun, September 1, two.

Vireo olivacea. RED-EYED VIREO.—August 29, Tapia, one.

Mniotilta varia. BLACK AND WHITE WARBLER.—August 29, Tapia, also August 24, 1933, Tapia.

Dendroica aestiva aestiva. EASTERN YELLOW WARBLER.—August 22, Gatun.

Setophaga ruticilla. REDSTART.—August 29, Rio Tapia, four.

Icterus spurius. ORCHARD ORIOLE.—First date August 10, Gatun, common.

(3) Birds that we found breeding during July and August.

Claravis pretiosa. BLUE GROUND DOVE.

Leptotila cassini cassini. CASSIN'S DOVE.

Leptotila verreauxi verreauxi. VERREAUX'S DOVE.

Phoebastria adolphus nelsoni. DUSKY HERMIT.

Damophila panamensis. PANAMA HUMMINGBIRD.

Malacoptila panamensis panamensis. PANAMA MALACOPTILA.

Thamnophilus doliatus nigricristatus. BLACK-CRESTED ANTSHRIKE.

Thamnophilus punctatus atrinuchus. SLATY ANTSHRIKE.

Automolus palidigularis pallidigularis. PALE-THROATED AUTOMOLUS.

Copurus leuconotus. WHITE-BACKED COPURUS.

Elaenia chiriquensis chiriquensis. LAWRENCE'S ELAENIA.

Oncostoma olivaceum. LAWRENCE'S BENT-BILLED FLYCATCHER.

Legatus leucophaeus leucophaeus. STRIPED FLYCATCHER.

Myiophobus fasciatus. BRAN-COLORED FLYCATCHER.

Manacus vitellinus vitellinus. GOULD'S MANAKIN.

Thryophilus rufalbus castanonotus. CHESTNUT-BACKED WREN.

Thryophilus galbraithi galbraithi. GALBRAITH'S WREN.

Cyanocopsa cyanoides cyanoides. PANAMA BLUE GROSBEAK.

Sporophila gutturalis. YELLOW-BELLIED SEADEATER.

Sporophila aurita. HICK'S SEADEATER.

Saltator striatipictus isthmicus. PANAMA STREAKED SALTATOR.

Arremonops striaticeps striaticeps. LAFRESNAYE'S SPARROW.

Thraupis cana diaconus. BLUE TANAGER.

Phoenicothera fuscicauda. DUSKY-TAILED ANT TANAGER.

Cacicus microhynchus. SMALL-BILLED CACIQUE.

It is evident from this list that the summer months cannot be called a general breeding season. A fair portion of the nests here recorded were found during the last half of July, and breeding records became fewer as the rains increased. No nests of such commonly represented families as the Virgonidae or Dendrocolaptidae were found, and almost none of the abundant and conspicuous Trochilidae, Formicariidae, Thraupidae or Icteridae. The most commonly nesting birds were the Columbidae and Fringillidae. Such families as the Tyrannidae and Troglodytidae apparently breed in cycles rather than seasons. Gould's Manakin, found in the height of a breeding period during the same months in 1933, did not nest. The localities covered included (1) Panama Vieja, a beach with a broad expanse of mud flat, on the Pacific side, seven miles from Panama City. (2) Rio Tapia, a grassy savannah-land, swampy rolling country on the Pacific side, twenty miles east of Panama City. (3) Madden Dam, primeval rain forest off the Zone up the Chagres river. (4) Barro Colorado Island. Forest type of region, located in Gatun Lake. (5) Pedro Miguel; Pacific side open country and second growth woods. (6) Gatun, Atlantic side, various types of country including grassy savannahs, scrub woodland, deep jungle and open plantations. Most of the shore-birds were seen along the Chagres River below the spillway. For the sake of consistency the order and nomenclature used in Sturgis has been followed. A few 1933 records have been

included and have been so designated.—ROBERT S. ARBIB, JR. and FREDERICK W. LOETSCHER, JR., *New Haven, Conn.*

Pre-Columbian Bird Remains from Venezuela.—In 1933 Dr. Edward W. Berry, Professor of Paleontology the Johns Hopkins University, conducted excavations in northern Venezuela during which there were obtained quantities of bird bones that have been submitted to me for identification. The region examined is near Lake Valencia (indicated on some maps as Tacarigua or Maracay), principally at a point known as Los Tamarindos near the end of the peninsula of La Cabrera, which extends into the lake on its north side.

According to information supplied by Dr. Berry there are here four wave cut terraces between the present water level and an elevation above it of 45 to 50 feet, indicating a considerable extension of the lake in prehistoric times. The deposits begin with a surface layer of humus of varying thickness, of terrestrial formation, followed by series of deposits of sands and gravels, diatomaceous earths, Planorbis marls, and layers of organic material. Excavation through these has yielded abundant evidence of prehistoric human occupancy in the form of pottery fragments and burials. With such material, and also separately from it, are bones of various vertebrates including the birds presently to be mentioned. While some of these birds were killed by early Indians others appear to have been deposited through natural means. Some of the bird bones were obtained from the waste dumps of earlier excavations and are of unknown origin. The majority were collected during careful stratigraphic studies by Dr. Berry's party, beginning in the superficial layers of humus at a depth of three feet, and extending into lower levels in lake bed deposits ranging from six to eleven feet below the surface. Some bird remains were found in delta deposits in a sand pit known as Cascabel about three and three-fourths miles west of the present shore line on what had formerly been an island in the enlarged lake. Others came from debris accumulated in water beneath pile houses, now forming a slight mound on a low flat two and one-half miles southeast of the lake on the Hacienda Tocarón. These were found from one-fourth meter to one meter below the surface.

Dr. Alfred V. Kidder 2d, of the Peabody Museum at Harvard University, who worked in the Valencia region in 1934 has distinguished in this area two human cultures¹ one supposed to be of a people of Carib affinity who inhabited the area at the arrival of the Spanish, whose remains are found in the surface of humus area, and another, older, of the Arawak group, that, according to Dr. Kidder, dates back at least to 1000 A. D.

The bird bones examined are brown in color, varying somewhat in shade, and while not fossilized are free from organic material. Their actual age is not definite but there is no question that they are several hundred years old and some of them may be considerably older.

Dr. Berry is certain that the older beds at Lake Valencia are Pleistocene but the line of separation between these and the deposits of the Recent period is still to be ascertained. Pleistocene and later invertebrates and plants from these deposits have been discussed by Charles T. Berry.² It is possible that birds of Pleistocene age may be found in the deeper layers.

Following is a brief account of the bird material. Except in one form identification is made to species without regard to the subspecies now recognized as ranging in this area.

¹ Science News Letter, February 23, 1935, p. 117; Science, vol. 81, March 1, 1935, p. 222.

² Journ. Washington Acad. Sci., vol. 24, 1934, pp. 387-395; idem, p. 500.

From three feet below the surface in the humus layer at Los Tamarindos, which in point of antiquity antedates the time of the Spanish discovery (as no glass beads or iron objects are found among the human artifacts), the following birds are identified: Brazilian Cormorant (*Phalacrocorax olivaceus*) and the Horned Screamer (*Anhima cornuta*).

In the deeper layers, from six to eleven feet from the surface, the following were obtained: Pied-billed Grebe (*Podilymbus podiceps*), Brazilian Cormorant (*Phalacrocorax olivaceus*), Cocoi Heron (*Ardea cocoi*), Egret (*Casmerodius albus*), Wood Ibis (*Mycteria americana*), Gray-breasted Tree-duck (*Dendrocygna autumnalis discolor*), Fulvous Tree-duck (*Dendrocygna bicolor*), White-faced Tree Duck (*Dendrocygna viduata*), Black-collared Hawk (*Busearellus nigricollis*), Red-winged Hawk (*Heterospizias meridionalis*), another Hawk of the genus *Buteo*, Curassow (*Craz alberti*), Purple Gallinule (*Ionornis martinica*), Gallinule (*Gallinula chloropus*), Rusty Dove (*Leptotila verreauxi*), a large Macaw (*Ara* sp.), an Amazon Parrot (*Amazona* sp.), a small Paroquet of uncertain genus, and the Cayenne Owl (*Rhinoptynx clamator*).

The midden deposits at the Hacienda Tocarón yielded the following: Brazilian Cormorant (*Phalacrocorax olivaceus*), an Ibis (*Guara* sp.), Horned Screamer (*Anhima cornuta*), Gray-breasted Tree-duck (*Dendrocygna autumnalis discolor*), White-faced Tree-duck (*Dendrocygna viduata*), Baldpate (*Mareca americana*), Muscovy Duck (*Cairina moschata*), Limpkin (*Aramus scolopaceus*), and a Gallinule (*Gallinula chloropus*).

In the sandpit at Cascabel there was found a humerus of the White-faced Tree-duck (*Dendrocygna viduata*).

The Baldpate, represented by a left humerus lacking the head, has not been recorded previously, so far as I am aware, from Venezuela. The other birds are those that are to be expected in this locality, the majority being forms that frequent aquatic or marshy habitats.—ALEXANDER WETMORE, U. S. National Museum, Washington, D. C.

On Paired Ovaries.—The persistence of but a single ovary, the left, is the normal condition in birds, though there are well known exceptions. The work of Gunn,¹ Kummerlöwe,² Fitzpatrick³ and many others, but especially that of Gunn, has brought out the fact that bilateral development of ovaries is not uncommon in Hawks. In the genera *Accipiter*, *Circus* and *Falco* the bilateral condition may be as common as the unilateral condition. Occasional instances were recorded of the presence of paired ovaries in quite unrelated species as Grebe, Fulmar, Duck, Swan, Grouse, Rail, Gull, Woodcock, Owl, Thrush, Rook and Sparrow.

While in Madagascar and New Guinea, collecting birds for the American Museum, I noted the bilateral development of ovaries in some species of Hawks, but not in others, and also found this condition not unusual in certain Parrots and Lories. Its occurrence in Parrots and Lories has apparently not been recorded. In the species I examined the right ovary varied from one-fourth the size to nearly the same size as the left. In some cases the right ovary showed some enlargement but in no instance did this enlargement approach a breeding condition. Rudiments of a right oviduct were found but in no instance did it appear functional.

The following is a list of the species in which I observed right ovaries present. (The number of specimens examined of the Madagascar species was not kept carefully.)

¹ 1912, Proceedings Zoological Society, London, pp. 72, 73.

² 1931, Zeitschr. f. mikroskop.-anat. Forschung, 24, pp. 614-621.

³ 1934, Wilson Bulletin, XLVI, pp. 19-22.

	No. females with right ovary present	No. females examined
<i>Machaerhamphus anderssoni</i>	1	
<i>Haliastur sphenurus</i>	1	4
<i>Accipiter madagascariensis</i>	2	
<i>Accipiter francesii</i>	11	
<i>Accipiter fasciatus</i>	5	5
<i>Accipiter novaehollandiae</i>	1	1
<i>Circus aeruginosus</i>	1	
<i>Gymnogenys radiatus</i>	1	
<i>Ieracidea berigora</i>	2	2
<i>Coracopsis nigra</i>	Several	
<i>Chalcopsitta scintillata</i>	1	3
<i>Trichoglossus haematodus</i>	1	8
<i>Eclectus roratus</i>	2	4
<i>Psittacella brehmii</i>	1	5

Thus the presence of a right ovary seems not uncommon in certain Parrots and Lories as well as in some Hawks.

Some of Riddle's¹ work, done some time ago, is suggestive in this connection. Working with Pigeons, he found some females with persistent right ovaries and observed that this condition occurred almost wholly in females hatched from eggs otherwise known to have the greatest or strongest female producing tendency, and from which a high per cent of females hatched.

May it be that the not uncommon persistence of a right ovary in certain groups of birds is indicative of a tendency toward femaleness in these species, and furthermore may be expressed in the sex ratio, there being a larger number of females than males in these forms? I have no data on the sex ratios of these birds, but possibly there is some such correlation as suggested above.

There seems to be no general correlation between the development of bilateral ovaries and sexual dimorphism. In the Hawks the chief sexual difference consists of the females being larger; in *Eclectus roratus* the female is slightly smaller and largely red, while the male is larger and chiefly green. In *Psittacella brehmii* the male is brighter and slightly larger. In the other Parrots there is little difference between the sexes except the slightly smaller size of the female.—A. L. RAND, *Amer. Museum Nat. Hist., New York*.

¹ 1916, *American Naturalist*, L, pp. 409, 410.

RECENT LITERATURE.

May's 'Hawks of North America.'—Not since 1893, over forty years ago, have the Hawks of North America had special treatment such as is accorded them in the handsome volume¹ before us, although on every side and from almost every state in the Union pleas for their conservation and convincing evidence of the economic value of most of the species have appeared. While the destruction of these birds by farmers was perhaps never of major importance the efforts of Dr. Fisher and the Biological Survey had largely converted them to the protection of the majority of the species, when the appearance of so-called sportsmen in the picture threatened the extermination of all of our birds of prey. With the advent of game farms came the European idea of killing all "vermin" on the part of professional game keepers. Following this came "vermin hunts" on the part of shooters with nothing else to shoot and the concentration of marksmen at Hawk Mountain, Pa., Cape May, N. J. and other strategic points where migrating Hawks gather.

So strong a hold has this practice obtained on the State Game Commissions and individual sportsmen, fostered by many sportsmen's journals, that the task of rescuing the remainder of these beautiful birds is vastly greater than before. It is gratifying to find the National Association of Audubon Societies taking such a prominent part in this campaign and an evidence of the thoroughness of the reorganization recently effected through the installation of new blood in that organization.

Dr. May has given us an admirable résumé of the whole Hawk question with details on food and methods of identification. Then follows a systematic treatment of all of the species and subspecies of North American Hawks, Eagles and Vultures, with accounts of habits, appearance and distribution and little maps showing the breeding ranges at a glance. There is a brief foreword by Dr. T. Gilbert Pearson, President Emeritus of the Association.

A notable feature of the book is the series of thirty-seven colored plates of the most important species by Major Allan Brooks and four of the under sides of all species in flying position by Roger T. Peterson. Anyone familiar with the cost of colored plates will realize what we owe to the Association for making it possible for one to obtain such a series, some of which are among the best of Brooks' paintings, for a merely nominal price, and in no way could the general public be better informed of the differences in our Hawk species and helped to easy identification.

Every fair-minded sportsman should obtain this book. As the advertisement says it is a "Book of Facts—Form your Opinion"; as to what that opinion will be there should be no doubt!

Every bird-lover and every collector of books on nature should also obtain a copy not only for his own enjoyment but to help repay the National Association for their outlay in the cause of our wards—the Hawks.—W. S.

Howard's 'The Nature of a Bird's World.'—This little book² is one which demands most careful reading and which furnishes much food for thought. In its study the ordinary observer of bird actions will be deeply impressed by the wide differences between his interpretations of what he sees and the interpretations of a

¹ The Hawks of North America their field identification and feeding habits. By John Richard May. Illustrated by Allan Brooks and Roger Tory Peterson. Published by the National Association of Audubon Societies, 1775 Broadway, New York City. 1935 Pp. 1-4x + 1-140. Price \$1.25.

² The Nature of a Bird's World. By Elliot Howard Cambridge at the University Press 1935. Pp. 1-102.

past master in the study of animal behavior. There is a history of a Waterhen (our Florida Gallinule) with detailed study of its successive actions through the annual cycle and their cause and meaning; a series of experiments on a Yellow Bunting which was little concerned by the removal of her nest and young a short distance from the original site but when another nest with blown eggs was placed in the old site she immediately began to incubate them and deserted her young, an example of the attraction of "location." Mr. Howard's interpretation of all of these actions are most interesting but even he does not pretend to solve the mysteries of bird life and some of his deductions seem a little far-fetched.

In his preface he says, "I seek the nature of a bird's world, not with any hope of finding it but to know what to find." He sums up the various mysteries in bird life and adds, the bird "seems to mingle the blindness of an insect with the intelligence of an ape; and because nothing is really blind and no one is likely to know what intelligence really is, mysteries will be mysteries still."

The real object of his studies is a search for the relation between birds' reactions to territory, sexual functions, nest-building and care of the young. He treats the bird's world under several headings: Of its Physical Basis; Of its Division into Different Worlds—he suggests the existence of a breeding world and a feeding world more or less independent of one another—and Of its Relation to Learning. Students of animal behavior will find Mr. Howard's book most interesting and suggestive while others may gain some idea of what legitimate interpretation of behavior really is.—W. S.

Herrick's 'Wild Birds at Home.'—Prof. Herrick's earlier book 'The Home Life of Wild Birds' set forth his method of removing a nest of young, including the branch or other support upon which it was built, to a convenient spot where a tent could be erected and the actions of both adults and young studied at close range, while the observer or photographer was concealed from them. The resultant information on bird behavior and close-up photographs added much to our knowledge of even the most familiar species.

That work being long out of print our author has prepared the present one¹ which is in many respects a new edition of the other but so full of new information that it deserves the different title which he has bestowed upon it.

After an introductory chapter on his method with remarks on the reproductive cycle of bird life and upon various phases of animal behavior, there follow intimate biographies of various species and chapters on the communal life in the Gull, on bird nests, with special consideration of nest building in the Robin, Barn Swallow and Oriole, and finally chapters on the development and care of the young and upon life and instinct.

Prof. Herrick has also incorporated in one of his chapters his interesting papers on the "Life and Behavior of the Cuckoo" which have been discussed long ago in these columns.

So full is this volume of instructive and interesting accounts of bird behavior and the author's interpretations of them that it is impossible to even refer to them in detail in the space at our disposal, but by being less technical than many treatises upon animal behavior his accounts are very readable and will attract the attention and interest of many who are repelled by more abstruse works on the subject.

Among the many subjects discussed are the multiple nests of Robins, when a bird builds several nests on successive steps of a stairway or in several openings between girders, where from the similarity of the locations she seems unable to decide per-

¹ *Wild Birds at Home*. By Francis Hobart Herrick. D. Appleton-Century Co., 35 W. 32nd. St., New York. Pp. i-xxii + 1-345. Price \$4.00.

manently upon one of them. We have, however, found three Robin nests side by side on a girder which was not divided by cross beams and in such a case this explanation seems inadequate. In his discussion upon the use of snake skins by the Great Crested Flycatcher our author thinks that it does so because they happen to attract its attention and not because of an instinct transmitted from generation to generation. This is undoubtedly true of birds which only occasionally make use of snake skins but we are inclined to think that the almost universal snake skin habit of this Flycatcher, like the constant use of certain moss stems by the Worm-eating Warbler, and the selection of clusters of *Usnea* by the Parula Warbler, etc., are real cases of inherited instinct.—W. S.

Taverner's 'Birds of Canada.'—Mr. Taverner's two works on the birds of East and West Canada have previously been noticed in these columns (1922, p. 582; 1927, p. 125). He has now combined these into a single book,¹ covering the birds of the entire country from the Atlantic to the Pacific and north to the Arctic regions. For the most part, the text and illustrations of the earlier publications have been used but there are many additions and portions are entirely rewritten, while the sequence and nomenclature of the last edition of the A. O. U. 'Check-List' have been adopted with the exception of the author's well-known practice of altering the English names to suit his ideas of specific and subspecific relationship.

The attractive little color plates from paintings by Hennessey and Brooks, from the previous works are used in illustration, with apparently some additions, but they here appear to better advantage as in the 'Birds of Western Canada' a slightly buff tint to the paper produced wrong color values. In the present work this is avoided but the reds unfortunately are often far too pale, especially in the Sapsucker and Red-winged Blackbird.

Mr. Taverner is to be congratulated upon this excellent work which will do much to advance ornithological interest in Canada while in its present form it will be a much more convenient work of reference than in the east and west volumes of a few years ago.—W. S.

Bergman's 'Birds of Kamtschatka and the Kurile Islands.'—This comprehensive account² of the birds of northeastern Asia is based upon two expeditions by the author under the auspices of several Swedish Scientific Societies and individuals, undertaken in 1920-22 and 1929-30 respectively. There is a review of the literature dealing with the ornithology of the two regions and an account of their physical characteristics with numerous excellent half-tone illustrations of scenery. Then follows a detailed account of each species found in Kamtschatka with a list of specimens obtained and quotations from other authors. A second part of the volume treats in a similar way of the birds of the Kuriles.

Halftone plates of a dozen species, a full bibliography and a map complete this excellent publication, which will be a reference volume for many years to come. It is well printed on heavy paper.—W. S.

Lamond's 'An Aviary on the Plains.'—Australian bird students have published many books of late years devoted to popular ornithology and we now have another³ by Henry G. Lamond. His "aviary" is a section of the table-land of north-central Australia, in Queensland and the North Territory, and his chapters are thoroughly

¹ *Birds of Canada*. By P. A. Taverner. Ottawa. J. O. Patenaude Printer to the King's most excellent majesty 1934. Pp. 1-445. Price \$2.00.

² *Zur Kenntnis Nordostasiatischer Vögel. Ein Beitrag zur Systematik, Biologie und Verbreitung der Vögel Kamtschatkas und der Kurilen. Mit 32 Bildern und 2 Karten von Sten Bergman.* Stockholm, Albert Bonniers Forlag 1935. Pp. 1-268. Price 20 kronor.

³ *An Aviary on the Plains.* By Henry G. Lamond. Australia, Angus & Robertson Limited, 89 Castlereagh Street, Sydney 1934. Pp. i-viii + 1-228. Price 6 shillings.

popular in character yet conveying much sound information and much of the joy of life in the open. It is just such a book as will attract the attention of many who had previously no particular interest in birds and will be likely to make them into bird-lovers if not ornithologists. The seasoned bird watcher too, will find interesting reading in Mr. Lamond's vivid pictures of bird action and of the relations between observer and bird.

The sketches were published serially in the 'Pastoral Review' and well deserve preservation in book form.—W. S.

Bird Stamps of All Countries with a Natural History of Each Bird.—The many sides of ornithology and the various angles from which the subject may be approached have often been commented upon and in the present publication¹ we have a further illustration of these facts.

We have here a postage stamp album prepared exactly like the current albums with illustrations of the stamps and spaces for the various denominations, but only stamps bearing the picture of a bird are included and the primary arrangement is by birds instead of countries, the latter forming a secondary grouping. Under "Condor" for instance we find eleven stamps from the Argentine bearing its picture; four from Bolivia; three from Chili and three from Colombia, those of Bolivia dating back to 1866. Some forty-two different kinds of birds are included and opposite each page of the album is a popular account of the bird. While these are usually accurate so far as they go, we are surprised to find the Australian Kingfisher, the Kookaburra, placed in the Cuckoo family, and said to be "the only Cuckoo to reach Australia"!

The author of this album who we presume is Mr. William D. Cox, has hit upon an admirable way to interest boys in birds as well as in stamps. The immense number of postage stamps available today makes a general collection unsatisfactory and only by selecting a special country or subject can even a partially complete collection be made. Excellent as his idea is, it would seem that the subject is not entirely new. Dr. Samuel C. Palmer some years ago made a communication before the Delaware valley Ornithological Club on bird portraiture on postage stamps and Mr. Sidney R. Esten had a paper in a recent issue of the Indiana Audubon Society's 'Yearbook' on the same subject. We foresee many collections of "bird stamps" in the near future and a probable increase in the catalogue prices of all such issues, while as a result may we not hope for additions to the ranks of ornithologists with an interest in the birds of the World.—W. S.

Tufts's 'Some Common Birds of Nova Scotia.'—Mr. Tufts, Chief Migratory Bird Officer of the Maritime Provinces of Canada, has prepared this popular account of fifty of the more common birds of Nova Scotia as a "bird primer" for the children of the Nova Scotia schools and as a field guide for others interested in birds.

There are well written accounts of the several species with colored plates from paintings by Hennessey, all we believe borrowed from Taverner's reports on Canadian birds, and numerous bird poems by various writers.

The little book is attractively gotten up and should serve well in the field for which it is intended. Unfortunately in the copy before us, at least, a number of the plates are off register presenting a blurred effect.—W. S.

Glegg's 'A History of the Birds of Middlesex.'²—We have expressed surprise

¹ Bird Stamps of All Countries with a Natural History of Each Bird. Grosset & Dunlap. William D. Cox, Editor. Pp. 1-57. Price \$1.00.

² A History of the Birds of Middlesex. By W. E. Glegg, F. Z. S., M. B. O. U., author of 'A History of the Birds of Essex' with six plates and a map. London, H. F. & G. Witherby, 326 High Holborn, W. C. Pp. 1-xxii + 1-245. Price 18 shillings.

on previous occasions at the possibility of publishing such extended county lists of birds in England compared with the difficulties attending such publications in America. Middlesex is with one exception the smallest county in England, some twenty by fourteen miles in extent, but it is noteworthy from the fact that it includes within its boundaries a large part of the City of London. One would suppose that such a thickly inhabited region would offer little of ornithological interest and that Harting's report on the birds of Middlesex published in 1866 would not admit much opportunity for additions, in view of the rapid spread of the metropolitan districts. This very extension has however brought with it the construction of sewage farms and reservoirs with a water area of over 1000 acres, which have offered increasingly attractive resorts for shore-birds and waterfowl respectively, and have added many records. Mr. Glegg's book is an historical résumé of the records for each species with an account of its present status, migration and breeding dates, etc., with an introduction covering general problems, a good detailed map and a bibliography of some 1300 titles. A model work of its kind and an indispensable reference volume for all interested in British ornithology. It is handsomely printed and illustrated with several aeroplane views of the country.—W. S.

Economic Ornithology in Recent Entomological Publications.—It is hoped that notes under this heading, so long continued (since 1911), justify themselves by their interest for ornithologists. Certainly the propagandist for bird protection can find much "grist for his mill" in the series, as for example such statements as that in the last entry of the present installment to the effect that birds are as important in certain cases as all other predators combined.

Green Stinkbug (*Acrosternum hilaris*).—This is an insect known to be injurious only locally but which restrictedly may be a very troublesome pest. The plants most injured in Virginia where the study¹ here reported on was made are lima beans and peaches. It is noted that "game chickens greedily devoured both nymphs and adults," and that Biological Survey records show 37 species of birds to feed upon stinkbugs of the same genus. Nine of these birds, common in Virginia, are specifically named.

Beet Leafhopper (*Eutettix tenellus*).—Some Utah entomologists took a favorable opportunity of learning about bird enemies of this well known pest. Birds were collected, their stomachs examined and remains of the leafhoppers found in those of 12 out of 20 species represented. The names of the birds are given together with the number of leafhoppers found. The authors state, "It appears that migrating, as well as native, insectivorous birds will readily feed upon the beet leafhopper when this insect is present in abundance."²

Japanese beetle (*Popillia japonica*).—This insect is a pest of great importance to early-ripening fruit, to corn, and to truck crops. While neither control measures nor natural enemies are preventing it from steadily extending its range, credit should be given notable predators, at least for efforts in a desirable direction. Comment on bird enemies of the Japanese beetle was given in 'The Auk' for July 1926 (pp. 396-397) and additional information of value may now be extracted from a publication³ by C. H. Hadley and I. M. Hawley. These authors consider the Crow, Purple Grackle, Starling, Cardinal, Meadowlark, Catbird, Robin, and English Sparrow as

¹ Underhill, G. W., The Green Stinkbug, Bul. 294, Va. Polytech. Inst., Feb. 1934, 26 pp., 9 figs.

² Knowlton, G. F., J. S. Stanford, and C. F. Smith, Birds as Predators of the Beet Leafhopper, Journ. Ec. Ent., 27 (6), Dec. 1934, pp. 1196-1197.

³ U. S. Dept. Agr., Circ. 332, Dec. 1934, pp. 19-20.

worthy of special mention. In one case Starlings are known to have reduced the population of grubs from an average of 100 to 5 or 6 per square foot.

Tortoise Beetle (*Metrona circumdata*).—This beetle is a pest of sweet potatoes and other food crops in China. The adult is warningly colored, and the larvae and pupae are both of peculiar form and spiny so that they are no doubt classed among protected insects. The author of a recent report¹ on the insect, however, found that all stages are eaten by birds and lists 8 species in the stomachs of which he found remains of the insect. The percentages of the stomach contents so constituted varied from 0.45 to 18.66.

Black-flies (*Simuliidae*).—These insects in addition to being annoying almost everywhere they occur, seriously afflict mankind in various regions by transmitting disease-producing nematode parasites. In connection with an account of such a situation in Guatemala Dr. Joseph C. Bequaert sums up² information on natural enemies of the flies, including birds. Most of the data traces back to Biological Survey records and the number of species of check-list birds involved is six. The Green-winged Teal, Blue-winged Teal and Water Ouzel are listed as feeding on the immature, and the Ruby-throated Hummingbird, Vaux's Swift, Philadelphia Vireo, and Ouzel, on the mature stages of blackflies.

Celery leaf tier (*Phlyctaenia rubigalis*).—Although it occurred in Florida celery fields for years before, this insect did not become seriously destructive until 1923. It caused great losses in 1925 and the stability of the industry was threatened. Temperature is the most important control factor, with egg parasites next. "In a normal season," according to authors³ of a recent bulletin on the insect, "birds are the third most important factor in the control of the celery leaf tier, and for about 5 or 6 weeks in the spring they constitute the major control" (p. 41). The findings as to birds are based on field work and stomach analyses by F. M. Uhler of the Biological Survey in 1927 and 1928, but it may be of interest to state that study was carried on in later years by Dr. Dayton Stoner who has prepared a comprehensive manuscript report on bird enemies of the pest; it is hoped that this also will be published.

The birds reported in the Bulletin here cited as feeding most freely on the celery leaf tier include several migrants that usually do not win a place in lists of predators upon economically important insects. The Yellow Palm Warbler, for instance gets first mention, and after it the Tree Swallow, Pipits, Grackles, Red-winged Blackbird, Bobolink, and Cowbird. Summer residents that participated notably in the warfare on the tier were the Mockingbird and Meadowlark.

Birch leaf-mining sawfly (*Phyllotoma nemorata*).—This recently introduced sawfly ravaged birches in northern New England in 1927. At first little evidence of bird attack upon it was noted but year by year an increase was observed and measured by survey methods. A. E. Brewer of the Maine Forest Service reports⁴ that by 1933 the destruction of prepupae had grown to nearly 50% and that of larvae to 20%. The prepupae are taken from wintering cells in the leaves both when they are on the trees and after they fall to the ground, Chickadees and Warblers being most prominent in the former activity, and Sparrows in the latter. Fifteen species of birds are mentioned as being positively known to feed on the insect. "The data secured strongly indicate that birds have been the most important predatory check upon the birch

¹ Yeung, K. C. Lingnan Science Journ., 13 (1), Jan. 1934. p. 159.

² Onchocerciasis, with special reference to the Central American form of the disease, Contr. Dept. Trop. Med. Harvard Univ., 6, 1934, pp. 190, 201.

³ Ball, E. D., J. A. Reeves, B. L. Boyden, and W. E. Stone, U. S. Dept. Agr., Tech. Bul. 463, 55 pp., 26 figs., Feb. 1935.

⁴ Journ. Ec. Ent., 27 (2), April 1934, pp. 342-344.

leaf-mining sawfly during the last three seasons and probably have been as important as all other predators combined." (P. 343).—W. L. M.

Mendall on Fish-eating Birds in Maine.—Howard L. Mendall reports¹ on two summers' field observations and on the examination of the contents of stomachs or regurgitated material illustrating the food habits of four species of birds. Their names and the percentage of individuals eating various types of food are given in the following table:

Name of Bird	Fish	Young Lobsters	Berries and other Vegetation	Echinoderms	Insects
Common Tern.....	45.8	1.9	1.9	1.3	10.9
Laughing Gull.....	37.5	5.0	—	15.0	30.0
Herring Gull.....	36.3	13.9	16.8	16.6	11.8
Double-crested Cormorant.....	80.0 (or more)	—	10.0	—	—

The food items listed are not all that were found but are those upon which estimates of economic value are based. The fish taken are said to have been chiefly herring and mackerel except in the case of the Cormorant which had eaten sculpin, cunner, flounder, eel, herring and tomcod. The first two species have no commercial use and are said to prey upon economically important fishes, while the last four are food fishes. The percentage of Cormorants taking fishes may be larger than 80 but the total is not given. The Cormorant is exonerated from serious blame and its protection is urged.

Although the Herring Gull ranks lowest in the tabulation as a consumer of fishes it is considered a menace to the fishing industry. It is regarded as materially destructive also to young lobsters and to blueberries. The Common Tern and Laughing Gull are excused for taking only a small share of commercial fishes and appear to capture very few young lobsters. The Laughing Gull is given considerable credit as a consumer of insects and echinoderms although apparently being surpassed by the Herring Gull as a predator upon the latter animals which do some damage to shellfish. The destruction of blueberries by Herring Gulls is regarded as serious and feeding upon fish distributed as fertilizer also is charged against this bird. The species is considered a menace to other birds as a predator upon their eggs and young.

The accusations as to agricultural damage have been investigated from time to time by the Biological Survey, usually found less serious than reported, and considering the wary nature of the birds, apparently susceptible of some relief through the use of frightening devices.

In the reviewer's opinion the investigation reported upon would have been improved by use of the volumetric system of showing the consumption of food and by closer identification of food items particularly of insects than is shown in the published account. It is evident that the economic ratings announced for the three Laridae, at least, are a function of the relative numbers of the birds rather than of significant differences in their food habits. The Herring Gull is overabundant, from man's point of view, but if the other species attained equal numbers they would probably be considered injurious, at least to fisheries.

The increase in the numbers of Herring Gulls since the practical abolition of

¹ The relationship of certain sea birds to the fishing industry of the State of Maine, Bul. Dept. Sea and Shore Fisheries, apparently repaged 1-28, illus., 1935.

traffic in the plumage of native birds has often been commented upon, and has resulted ere this in complaints of damage. Most problems of economic injury by birds result from overabundance. Often something should be done to correct the trouble and such a need is now apparent in the case of the Herring Gull on the Maine, if not on the entire New England, coast.

When it comes to judging how many eggs and young of other birds (of similar economic tendencies) Herring Gulls should be allowed to consume we get into the deep waters of ecological relationships wherein we are so inexpert as only to flounder about, not knowing really what course to follow. We can extend preferential treatment to species as we please (better, as we are able) but we should not pretend that such treatment is based on knowledge of what the relative numbers of those species should be under natural conditions. We simply do not know what if any numerical relationship may be normal, nor do we know what range of fluctuations the species may tolerate without threats to the continued existence of any of them.

It is good to have food habits research carried on anywhere as it is essential to the proper solution of all problems in economic ornithology, but one could wish to have it done chiefly by one central organization, as well equipped as possible, so that the work could attain the highest possible standards. This is not intended as a criticism of the author here reviewed as he undoubtedly did the best he could under the conditions surrounding the investigation.—W. L. M.

Griscom's 'Ornithology of Panama.'—Mr. Ludlow Griscom, who has given much attention to the birds of Panama for some years past, has prepared a list¹ of the species and subspecies recorded from the Republic with their general range and their distribution in Panama. He has studied most of the collections of Panama birds in America and several of those in Europe, a total of 16,637 specimens, while on several trips to the country he has had personal field experiences with some 700 forms. He is therefore well qualified to prepare such a list as is here presented.

As an introduction Mr. Griscom presents a discussion of the life zones of the Republic. He first emphasizes the fact that Panama is sharply divided by the isthmus into two areas—Western Panama, practically an extension of the Costa Rica highlands; and Eastern Panama, the northern apex of the rain forest of Colombia with a mountain fauna similar to that of the western Colombian Andes. He then considers the Temperate, Sub-tropical and Tropical zones of each and their divisions, listing the characteristic species.

The list will be of the greatest value to those engaged in the study of middle American birds and we are much indebted to Mr. Griscom for bringing together all of the recorded information on the Panama species. The avifauna of Panama is exceedingly rich, the reviewer's list of the birds of the Canal Zone included 432 forms and the present one, covering the entire Republic, totals 1038, while 400 species are recorded from the Tuyra Valley alone!—W. S.

Pickwell's 'Bird Studies.'—One of the best of recent publications for the teaching of ornithology in schools is Dr. Gayle Pickwell's series of 'Natural History Pictures' covering the birds. There are forty-eight excellent half-tone prints 8 x 10 ins., from actual photographs, representing nests and eggs, young and adult birds of various species. Accompanying these is a booklet of seventy-one pages, giving on single pages printed on one side of the paper, a full account of each picture with details on the birds represented. These may be cut out and mounted on the backs of the pictures or both mounted on heavier guards.

¹ The Ornithology of the Republics of Panama. By Ludlow Griscom. Bull. Mus. Comp. Zool., Vol. LXXVIII, No. 3, April, 1935. Pp. 261-383.

Then there is a series of topics, each presented in tabular form, with references to the pictures which may be used in illustration: Nests; Life History of the Pipit; The Growing Up of Birds; Foods and Methods of Feeding; Protection; The Story of the Cowbird; The Classification of Birds; and finally a list of questions to be answered from the preceding text and a list of good bird books.

There are we understand two other sets of these 'Natural History Pictures,' Unit I, covering 'Animal Studies' and Unit II, 'Desert Studies.' The price is \$6.00 per set, published by Publishers Distributing Service Inc., Los Angeles, Calif.—W. S.

Allen and Brooks on the Tanagers and Finches.—The latest series of color plates by Allen Brooks in the 'National Geographic Magazine'¹ represents the Tanagers and the more gaily colored Fringillidae—Grosbeaks, Finches etc. While the plates are excellent for identification, the birds do not seem to us to be as much endowed with life and action as most of Major Brooks' paintings. The text, by Dr. A. A. Allen, is full of interesting and reliable information and there are several half-tones from photographs by the author and others.—W. S.

Proceedings of the Linnaean Society of New York.²—As usual this publication contains much of value. The present issue begins with Dr. Gregory's discussion of the origins of the Ratites and Penguins (see p. 340). Dr. Ernst Mayr then discusses the number of known genera and species of birds, concluding that there are 2600 valid genera and that the total of species and subspecies is 27000. His discussion is interesting. In another paper by the same author he presents a translation of Bernard Altum's territory concept, published in 1868, which in many ways forestalled Howard's theory. William Vogt presents an annotated list of the birds of the Jones Beach Sanctuary, Long Island, and a Review of Ornithology for the New York Region for 1932. Dr. Mayer has a similar review for the year 1933. There are a number of shorter notes and abstracts of the proceedings of the Society.—W. S.

New York Bird Day Bulletin.—School Bulletin No. 13,³ issued by the University of the State of New York, is devoted to birds. There is an interesting account of a Midwinter Grebe Flight in the state by R. A. Johnson; an account of a Rochester Wild-Life Sanctuary, by W. B. Large; Are Our Waterfowl Doomed? by Dayton Stoner; The First Spring Blackbirds by J. T. Nichols; Birds Among Skyserapers, by Roger T. Peterson; The Recent Movement for Hawk and Owl Protection, by Warren F. Eaton; Twenty-four Days with the Little Green Heron, by Chester J. Osborn; Ducks Fly North in the Fall, by William Vogt; and The Helderberg Falcons by Guy Bartlett. An excellent publication which cannot but interest all in bird study and protection.—W. S.

Other Ornithological Publications.

Bailey, Alfred M.—Nesting Days. (Natural History, April, 1935.)—Brief account of a number of familiar birds with beautiful illustrations from photographs by the author.

Bailey, Alfred M.—Below the Border.—A naturalist's visit to Durango, Mexico, where *Xenospiza baileyi* was discovered.—(Natural History, March, 1935.)

Bailey, Harold H.—A New Race of Ringed Turtle Dove in the United States.

¹ National Geographic Magazine, April, 1935. Pp. 505-532.

² Proceedings of the Linnaean Society of New York for the Two Years Ending March, 1934. April 15, 1935. Pp. 1-119. Price 75 cts. (Amer. Museum of Nat. Hist., New York City.)

³ Bird Day, April 15. Bull. of the University of the State of New York, Vol. 21, No. 13. March 15, 1935. 118-136.

(Bulletin 9, Bailey Museum and Library of Natural History, Miami, Fla., February 1935.)—Albinos bred in captivity are called *Streptopelia risoria alba* (p. 2).

Baxter, Evelyn V. and Rintoul, L. J.—Notes on the Status of Birds in Scotland in 1934. (Scottish Naturalist, March–April, 1935.)

Elder, H. F. D.—Bird Notes from the Isle of May. (Scottish Naturalist, March–April, 1935.)

Black, J. D.—Birds of the Winslow, Arkansas, Region. (American Midland Naturalist, March, 1935.)—An annotated list of 175 species.

Brodkorb, Pierce.—A New Flycatcher from Texas. (Occasional Papers, Museum of Zool. Univ. of Michigan, No. 306, January 30, 1935.)—*Empidonax difficilis hellmayri* from the Chisos Mts.

Burleigh, Thomas D.—Two new birds from the Southern Appalachians. (Proc. Biol. Soc. Washington, May 3, 1935.)—*Nannus hiemalis pullus* (p. 61), *Certhia familiaris nigrescens* (p. 62). Both from Mt. Mitchell, N. C.

Cottam, Clarence.—The Present Situation Regarding Eelgrass. (U. S. Biol. Survey Leaflet; February, 1935, mimeographed.)

Dale, E. M. S.—Some 1932 Bird Notes from London, Ontario. (Canadian Field Naturalist, March, 1935.)

Danforth, C. H. and Price, John B.—Failure of Theelin and Thyroxin to affect Plumage and Eye-color of the Blackbird. (Proc. Soc. Exp. Biol. Med., Feb. 1935, pp. 675–678.)—A matter of interest to ornithologists that may not come to attention because of the unfamiliar medium in which published, is the effect of endocrines upon sexual differentiation of plumage in birds. At an earlier stage of investigation it was thought that this might be the same in all birds but further experimentation has shown that this is not true. The literature is cited and briefly summarized in a recent paper and experiments reported upon, the results of which indicate that the color of the plumage and of the iris of the male Brewer's Blackbird is not subject to modification by injections of the female hormone or by thyroxin.—(W. L. M.)

De Lima, Jose L.—On the Occurrence of *Chordeiles v. virginianus* in Brazil. (Revista Mus. Paulista, XVIII, 1934, pp. 343–346.)

Edwards, Dorothy L.—The Dodo of Mauritius. (Natural History, March, 1935.)—Account of this species which became extinct more than 200 years ago, with photographs of the reconstruction by Ward in the American Museum.

Errington, Paul L.—Predators and the Northern Bob-white.—Claims very logically, as a reading of his article will show, that ordinary predator control does not do the game birds any good; that shooting of surplus game does not do it any harm; and that it does no good to replant game unless improving food and cover conditions are provided. An article that every sportsman should read.

Friedmann, Herbert.—Bird Societies.—An important and readable article on bird behavior forming chapter 5 of 'A Handbook of Social Psychology' published by Clark University Press. Dr. Friedmann considers roosts, flocks and migratory assemblages and community nesting; also the association of birds and mammals for the purpose of food. Under the latter heading comes the familiar statement of the Cowbirds gathering around cattle for the purpose of catching insects which the latter stir up. It would be of interest to collect Cowbirds under these conditions to see what they are actually eating. The reviewer has watched them with binoculars without seeing any attempt to catch any insects on the wing, the birds apparently feeding on seeds or something on the ground, and often preceding the cattle. He has, however, no other explanation of the association to offer.

Friedmann, Herbert.—Avian Bones from Prehistoric Ruins on Kodiak Island, Alaska. (Journal Washington Acad. Sciences. XXV, No. 1, January 15, 1935.)—An annotated list of forty species of which seven have not been recorded previously from the island. Indeed the author calls attention to the fact that there is no paper dealing exclusively with its avifauna, a need which he promises to fill at an early date.

Gowanloch, James N.—The Gulls, Terns and Skimmers of Louisiana. (Louisiana Conservation Review, April, 1935.)—Descriptions of the species with a history of their persecution, habits, range, etc. A valuable plea in behalf of these beautiful birds.

Gregory, William K.—Remarks on the Origins of the Ratites and Penguins, With Discussion by Robert C. Murphy. (Proc. Linnaean Society of N. Y. No. 45-46, April 15, 1935.)—A few years ago we had the pleasure of reviewing the papers by Dr. Lowe which are the basis of the present discussion (cf. Auk, 1928, p. 402 and 1934, p. 110). In this paper the authors, while welcoming the discovery of many interesting facts in relation to the structure of the Ratites and the Penguins, by Dr. Lowe, do not agree with his interpretations and would adhere to the old theory that both groups have been derived from flying ancestors. Dr. Gregory discusses mainly the osteological structure and Dr. Murphy the feathers and feather tracts. The paper should be read in conjunction with Dr. Lowe's contributions to this interesting subject. (cf. also Ibis, April, 1935—see below p. 347.)

Grinnell, Joseph.—A Revised Life-zone Map of California. (Univ. Calif. Publ. Zoology, 40, No. 7, 1935.)—The colored map is accompanied by some discussion and in connection with criticisms of Merriam's laws of temperature control our author says "no one with adequate field experience can doubt that objectively determinable zones of life having a general relation to temperature do exist" and that the limits of these zones are imposed upon plant and animal occurrences, in part, at least, directly, by variations in climatic temperature beyond certain critical levels." (cf. Auk, 1933, p. 130.)

Griscom, Ludlow.—Critical Notes on Rare Panama Birds. (Occas. Papers Boston Society Nat. Hist., VIII, pp. 199-204, February 21, 1935.)—*Mecocerculus superciliosus* (Scl. and Salv.); *Vireo carmioli* Baird and *Hylophilus viridiflavus* (Lawr.) *M. s. palloris* (p. 200) is described as new.

Griscom, Ludlow.—Observations on the Behavior of Animals During the Total Eclipse of August 31, 1932. (Proc. Amer. Acad. Arts and Sciences, Vol. 70, No. 2, March, 1935.)—Behavior of the Birds. Other groups of animals are contributed by four other authors.

Hicks, Lawrence E.—A Ten Year Study of a Bird Population in Central Ohio. (Amer. Midland Naturalist, March, 1935.)—In an 80 acre area near Westerville, 86 species have nested during the ten years covered by the study. The most abundant of these were (in average number of pairs per year): English Sparrow 27.9, Song Sparrow 24.2, Red-winged Blackbird 23.6, Robin 8.3, Bobolink 7.7, Yellowthroat 6.1, Barn Swallow 6, Cardinal 5, Catbird 4.9, Alder Flycatcher and Cowbird 4.8, Field Sparrow 4.6 and Meadowlark 4.4. The number of species (residents and migrants) ranged from 49 in January and 58 in February to 172 in May and 122 in October. This is a valuable contribution to local ornithology and we wonder how many local students are prepared to present a similar summary. The tendency today runs too much to getting long lists for a single day regardless of the area covered—so called "century runs," or notable "life lists," both matters of personal amusement rather than contributions to science.

Laing, Hamilton M.—Bird Notes from Vancouver Island, 1933. (Canadian Field Naturalist, March, 1935.)

Lewis, George A.—Anna and her All-electric Home. (Nature Magazine, April, 1935.)—An account of the nesting of an Anna's Hummingbird on an electric bulb, with several photographs. The birds have made use of this location for eighteen years adding to the nest when it has been broken down. It is not stated whether or not the bulb was lighted during the nesting.

Lincoln, Frederick C.—Ancestral Highways of the Sky. (American Forests, April, 1935.)—This and the following are résumés of the migration routes of Ducks and other birds from the data of the Biological Survey.

Lincoln, Frederick C.—The Waterfowl Flyways of North America. (Circular 342, U. S. Dept. Agriculture, January, 1935.)

McKeown, Keith C.—The Food of Birds from Southwestern New South Wales. (Records Australian Museum, XIX, No. 2, March, 1934.)—Examination of stomach and crop contents of 118 birds of 62 species with detailed account of the contents of each and a list of the species according to their food. There is also a bibliography of papers dealing with food study of Australian birds.

Magne de la Croix, P.—On the Evolution of Locomotion in Birds. (Anales de la S. C. Argentina, June, 1934.)—and Evolution of Terrestrial Locomotion in Vertebrates. (Revista Medicina y Veterinaria, 1932.)—Both in Spanish.

Mack, George.—A Revision of the Genus *Malurus*. (Memoirs Nat. Mus. Melbourne, No. 8. September, 1934.)—A detailed review with descriptions, keys, synonymy, maps of ranges, etc. *Malurus splendens aridus* (p. 108), W. Australia; *M. amabilis clarus* (p. 114), N. E. Queensland; and *M. coronatus caeruleus* (p. 124) Northern Territory, are described as new.

Moore, Robert T.—New Birds from Northwestern Mexico. (Proc. Biol. Soc. Washington, Vol. 48, May 3, 1933.)—*Ptilogonys cinereus otofuscus* (p. 112) Chihuahua, *Phloeocastes guatemalensis dorsofasciatus* (p. 113) Sonora.

Meredith, R.—The Yellow Rail in the Province of Quebec. (Canadian Field Naturalist, March, 1935.)

Osgood, Wilfred H.—Along Darwin's Trail, South America. (Science Service Radio Talks, Scientific Monthly, January, 1935.)

Peters, James L.—Remarks on the Avian Genus *Eos*. (Proc. Biol. Soc. Washington, Vol. 48, pp. 67-70, May 3, 1935.)—A new genus *Pseudeos* (p. 68) is erected for *Eos fuscata* Blyth, while *Eos* is restricted to seven species which are listed, and many synonyms are discussed, the whole group being thus satisfactorily rearranged.

Peters, James L.—A New Hawk of the Genus *Geranospiza*. (Proc. Biol. Soc. Washington, Vol. 48, pp. 71-72, May 3, 1935.)—*G. caeruleus flexipes* (p. 72) Chaco, Argentina.

Peters, James L. and Loveridge, Arthur.—New Birds from Kenya Colony. (Proc. Biol. Soc. Washington, Vol. 48, pp. 77-78. May 3, 1935.)—*Tyto capensis libratus* (p. 77) Kaimosa, Nyansa Prov.; *Zosterops silvanus* (p. 77) Mt. Mbololo.

Preble, Edward A.—Audubon, the American Woodsman. (Nature Magazine, April, 1935.)—A well written biographical sketch.

Riley, J. H.—Two New Forms of Birds from Southeastern Siam. (Proc. Biol. Soc. Washington, Vol. 48, pp. 53-54, May 3, 1935.)—*Cirropicus chlorolophus conjunctus* (p. 53); *Psarisomus dalhousiae cyanicauda* (p. 54).

Ritchie, James.—Great Age of Herring Gull. (Scottish Naturalist, May-June, 1935.)—Has lived 39 years in captivity. It was maimed when first found, one wing shot off at the wrist and one eye partly blind.

Solomon, Scott G.—Note on the Entozoa of a Herring Gull. (Glasgow Naturalist, December, 1934.)—Five species of parasitic worms recorded with notes on their life history etc.

Shaver, Jesse M. and Crook, Compton.—Birds of the Campus of Peabody College for Teachers, Nashville, Tenn. (Jour. Tennessee Acad. of Science. X, No. 2, April, 1935.)—Discussion of some forty spring transients with dates of arrival.

Shaw, Tsen-Hwang.—Variation in the Body Weight of the Tree Sparrow, *Passer montanus saturatus* Stejneger. (Bull. Fan Mem. Inst., of Biology, Peiping, China, VI, No. 2, 1935.)—Weights for each month in the year and for various localities. (In English.)

Sprunt, Alexander, Jr.—Do Eagles Steal Children? (American Forests, June, 1935.)—Answered, of course, in the negative, but with interesting discussion and amusing newspaper quotations.

Sumner, E. Lowell, Jr.—The Behavior of Some Young Raptorial Birds. (Univ. of California Publ. in Zoology, Vol. 40, No. 8, November, 1934.)—Interesting and detailed accounts of young of the Horned and Barn Owl and the Golden Eagle. The author concludes that "the initial, unmodified instincts of young raptorial birds are essentially the same as those of young passerine birds and young Cuckoos as outlined by Herrick, but the Owls are distinctly less precocial than Hawks.

Todd, W. E. Clyde.—Geographical Variation in the American Titlark. (Proc. Biol. Soc. Washington, Vol. 48, pp. 63-66, May 3, 1935.)—Birds of the far West are separated as *Anthus rubescens pacificus* (p. 63) British Columbia; and the Rocky Mountain specimens as *A. r. alticola* (p. 64) Colorado.

Trautman, Milton B.—Second Revised List of the Birds of Ohio. (Bull. Bureau of Scientific Research Ohio Dept., of Agriculture, Vol. I, No. 3, January 2, 1935.)—A nominal list of 345 species with symbols to indicate character of occurrence, with comments on extinct, doubtful and escaped species.

The Ornithological Journals.

Bird-Lore. XXXVII, No. 2. March-April, 1935.

The Need for a National Wildlife Program. By J. N. Darling.

Planting for Birds. By J. F. Matuszewski.

Coastal Carolina Bird-Trips. By Alexander Sprunt, Jr.

A Golden Eagle's Nest. By A. D. Aitken, Jr.—In Wyoming.

The Association's Waterfowl Campaign.

The Fieldfare and Other Norwegian Birds. By Margaret M. Nice.—Account of personal experiences.

The Rainey Wild Life Sanctuary.

On a Southern California Beach. By Lewis W. Walker.

Feathered vs. Human Predators.—Contains recent replies from game commissioners relative to the protection of Eagles and beneficial or neutral Hawks. Maryland—at least as represented by its state Game Warden, feels that it "should not be penalized with laws protecting" Hawks. We doubt, however, whether this represents the real attitude of the citizens. Is there no one in Maryland to speak up for these persecuted and largely beneficial birds and against the wholly mistaken attitude of its Game Commission?

We welcome the editorial on "mosquito control under the guise of unemployment relief." If the draining and ditching of our coastal marshes is to be continued as at present there will be no breeding marsh-birds left and no places where migrating shore-birds may stop. The reviewer is speaking from forty years experience at Cape May, N. J.

Bird-Lore. XXXVII, No. 3. May-June, 1935.

Our Migratory Waterfowl—An Inventory. By J. N. Darling.—Mr. Darling estimates the present stock of Ducks at 18 to 20 million and the legal kill for the last shooting season, owing to more drastic regulations, at about half of that of the preceding year. He further states that the majority of sportsmen accepted the situation cheerfully. This is all good news and if we all get together we may yet, as he says, preserve for all time an adequate stock of migratory Ducks and Geese.

He makes a rather curious statement about professional ornithologists saying that those devoting their efforts to the saving of the Ducks "can almost be counted on the fingers of one hand." Does Mr. Darling realize that outside of those employed in the Biological Survey and similar organizations all of the *professional* ornithologists of the United States can be counted on the fingers of three hands? And that they are employed in museums where executive and curatorial duties take nearly all their time. Even so it was largely the professional ornithologists who started the movement for bird conservation and to whom the establishment of the Audubon Societies and the Biological Survey is mainly due.

Predators and the Bird Preserve. By W. F. Eaton.

Intrepid Plovers. By Hazel S. Johnson.—Semipalmated Plovers on St. Mary's Islands, Gulf of St. Lawrence. (cf. paper on the same birds at the same place by E. D. W. Spingarn, Auk, 1934, pp. 27-36.)

Bird Study for Camps.

No closed Season. By A. D. Cruickshank.—i. e. for the bird photographers.

Along Maine's Coast. By Alfred O. Gross.

The usual educational and field study departments are fully maintained and the review pages much increased.

The Condor. XXXVII, No. 2. March-April, 1935.

Nesting of the Dusky Poor-will. By Elmer C. Aldrich.

Nests of Horned Larks and Longspurs on a Montana Prairie. By A. Dawes DuBois.—One of the most detailed studies of the kind that has ever been made, covering structure, position, incubation period, progress in development of young, etc. "Oölogists" who claim to be doing "scientific" work might well take a lesson here.

A Second Avifauna from the McKittrick Pleistocene. By Loye Miller.—In an asphalt deposit, one hundred feet from the former deposits, but containing an entirely different avifauna, largely aquatic.

Among the shorter notes is the record of a Dotterel shot in Washington, bringing this species, previously appearing in our list from a couple of Alaska records, within the limits of the States.

The Condor. XXXVII, No. 3. May-June, 1935.

Mockingbirds, their Territories and Individualities. By Harold Michener and Josephine R. Michener.—This remarkable paper is a detailed study of five mated pairs, covering thirty-four pages, and considers mainly territories and behavior. There is also much of interest regarding the regular songs of the species, both male and female, but we should have welcomed more attention to imitations, as we have always thought that many of the so-called imitations recorded in print are not really imitations at all. The birds here studied imitated "principally the California Jay and California Woodpecker with which they are associated almost constantly," while the immature birds sang a song "quite without imitations of other bird songs but distinctly a Mockingbird song." The writers used colored bands, an indispensable method for the study of individual birds, the usual bird band being mainly of use for migration investigation.

The Breeding Status and Migration of the Caspian Tern in Utah. By C. Lyman Hayward.

Racial Differentiation in *Passerella (Melospiza) lincolni*. By Alden H. Miller and T. T. McCabe.—Distribution of the three races recognized is discussed in great detail and a new form *P. l. alticola* (p. 156) from San Bernardino County, Calif., is described.

Continental Land Masses and their Effect upon Bird Life. By P. A. Taverner.

Notes on Some Birds of Lower California, Mexico. By J. Stuart Rowley.—Matter Supplementary to Grinnell's "Distributional Summation," obtained on a rather extended trip through the Peninsula.

The Wilson Bulletin. XLVII, No. 1. March, 1935.

The Natural History of the Long-billed Marsh Wren. By Wilfred A. Welter.—A detailed account of the activities of the species based upon studies of *Telmodytes palustris dissaepus* at Ithaca, N. Y. and *T. p. iliacus* at Staples, Minn. Territory, migration, behavior, nest building, etc. are considered in an interesting manner, forming one of the best biographies of the species that has yet been published.

A Study of the Savannah Sparrow in West Virginia. By Thos. E. Shields.

Notes on the Renal Blood-vessels of Raptorial Birds. By F. L. Fitzpatrick.

Robert Henry Wolcott. By M. H. Swenk.—A biography with portrait.

Birds at a Rain-pool in Massachusetts in October, 1933. By S. A. Eliot, Jr.

Bird Notes from the Big Horn Mountain Region of Wyoming. By John W. Aldrich.

Water Birds of a Virginia Mountain County. By J. J. Murray.

Changes in the list of Birds of Yellowstone National Park. By Emerson Kemsies.

The Oölogist. LII, Nos. 1, 2 and 3. January, February and March, 1935.

Birds Seen at Sea. By J. J. Murray.—Twenty-five forms seen between Norfolk, Va. and Havre, France. (Jan.)

Birds of Stratton, Vt. Prior to 1870. By G. W. Jones. (Jan.)

Bird Notes from Fall River, Larimer Co., Colorado. By Leon Kelso. (Feb.)

The Summer Birds of Northwestern Ohio. By Homer F. Price. (March).

Bird Banding. VI, No. 2. April, 1935.

Studies of a Tree Swallow Colony. By Lawrence B. Chapman.—A detailed study of a colony developed by the author at his home at Princeton, Mass. The number of fledglings leaving the nest boxes from 1931 to 1934 was: 7, 48, 61, 148—an impressive illustration of what can be accomplished in such efforts. There is a tabulation of fledgling mortality and returns.

How many Broods does the Starling Raise? By Lawrence E. Hicks.—Concludes that 95 per cent of the breeding Starlings of central Ohio produce only one brood. This coincides with our experience in the East and with the habits of the bird in England.

Notes on the Survival, Winter Distribution and Migration Speed of Eastern Mourning Doves. By Seth H. Low.—Birds banded on Cape Cod wintered from Delaware to central Florida, but mainly in Georgia. Actual recapture of banded birds showed that 81 survived one year, 27 two years, 10 three years and 3 four years.

The Murrelet. XVI, No. 1. January, 1935.

Some Records Supplementary to the Distributional Check-List of the Birds of the State of Washington. By J. M. Edson.

The Nebraska Bird Review. III, No. 1. January, 1935.

A Quarter Century of Spring Bird Migration Records at Red Cloud, Nebraska. By Charles S. Ludlow. A mass of arrival and departure dates.

The Nebraska Bird Review. III, No. 2. April, 1935.

The Songs of the Western Meadowlark. By Jessie M. and Mary A. Towne.—Records of 23 song records left by the authors' father, Dr. S. R. Towne.

The Case against the Bronzed Grackle. By Mrs. George W. Trine.—Destruction of nestlings of other species.

A History of Nebraska Ornithology. Early Explorations.

Iowa Bird Life. V, No. 1. March, 1935.

The adventures of a Flock of Wild Geese. By E. D. Nauman.—Captive birds which are the progenitors of many semi-domesticated flocks in the Middle West.

The Migrant. VI, No. 1. March, 1935.

Whisper Songs and Night Singing. By Mrs. F. C. Laskey.

Spring Migration at Athens, Tenn. By A. F. Ganiel from the records of W. R. Gettys.

Loggerhead Notes. By B. R. Warriner.

Christmas Census and local notes for Tennessee.

The Gull. XVII, Nos. 1, 2, 3, 4, and 5. January to May 1935. [Organ of the Audubon Society of the Pacific.]

Christmas Censuses for Benicia, Yosemite and San Francisco. (Jan.)

Annual Reports. (Feb.)

Lake Merritt, Oakland, Trip.—2290 Ducks of fourteen species were counted. (March.)

Winter Shore Bird Trip on San Francisco Bay. (April.)

Prairie Falcons. By C. W. Lockerbie. (May.)

Audubon Bulletin. [Illinois Audubon Society.] No. 24-25. 1934-1935.

Ducks without Shooting and Shooting without Ducks. By F. R. Dickinson.—An excellent brief review of the situation. To naturalists the only solution is a closed season. The gunners reply that with no shooting there will be no funds to employ wardens, and enforcement of a closed season will not be possible. The author concludes that education is the important thing, but before the present-day gunners can be educated the Ducks will be gone.

American Egrets in the Lake Region. By W. J. Beecher.

Field Days in Michigan. By E. R. Ford.

Bird Life in Northern Wisconsin. By James Mooney.

Martins and Martin Houses. By B. T. Gault.

Numerous short notes on observations and various phases of bird protection.

The following mimeographed journals continue to present much information of interest to residents of the regions of which they treat.

The Raven. VI, No. 2-3; and 4. February-March, and April, 1935. [Virginia Ornithological Society.]

Birds of the British Seashore. J. J. Murray. (Feb.-March.)

The Late William Palmer on the Birds of Hanover and King William Counties, Va. (Feb.-March.)

The Birds of a Scottish Mountain. J. J. Murray. (April.)

Jack Pine Warbler. XIII, No. 11. May, 1935. [Michigan Audubon Soc., Kent Museum, Grand Rapids, Mich.]

The Redstart. II, Nos. 6, 7 and 8. March, April and May, 1935. [Brooks Bird Club, Oglebay Park, Wheeling, West Va.]

Notes on the birds of Ohio, West Virginia and New Mexico.

The Flicker. VII, No. 1. February, 1935. [Editor, G. Swanson, Spring Valley, Minn.]

Notes on Birds of Minnesota.

News from the Bird Banders. X, No. 1. April, 1935. [Western Bird Banding Asso., Museum Vert. Zool., Berkeley, Calif.]

List of birds banded during the past year; minutes; notes on traps, etc.

Inland Bird Banding News. VII, No. 1. March, 1935. [Chicago Acad. Sciences.]

Duck Returns at Avery Island. By E. A. McIlhenny.

Banding Notes from Sault Ste. Marie, Mich. By M. J. Magee.

Homing Instinct of Cowbirds. By W. I. Lyon.

Long Island Bird Notes. February, March, April and May, 1935. [Woodmere Academy, Woodmere, N. Y.]

Weekly News Letters devoted to the ornithology of Long Island, N. Y.

A vast amount of data is here recorded by students of the Academy. On May 12, 1935, seventeen parties in the field compiled a list of 183 species!

Saint Louis Bird Club Bulletin. IV, Nos. 2, 3, 4, and 5. February to May, 1935. [3325 Bell Ave., St. Louis, Mo.]

News Letter of the Audubon Society of Missouri. II, Nos. 2, 3, and 4. February to May, 1935. [Rt. 5., Webster Groves, Mo.]

The Ibis (13th series). V, No. 2. April, 1935.

Notes on Some New or Rarely Recorded Burmese Birds. By J. K. Stanford with Critical Notes by Dr. C. B. Ticehurst. Part II.

On Birds of the Colony of Trinidad and Tobago. Part II. By Sir Charles Belcher and G. D. Smooker.

On a Collection from North-western Abyssinia. Part II. By Maj. R. E. Cheesman assisted by W. L. Slater.

On the Food of the Barn Owl. By Dr. C. B. Ticehurst.—Study of the food of captive birds shows conclusively that each pellet represents the food of an Owl taken in the evening previous. In 165 pellets were remains of 646 animals, mainly rats, mice and shrews. Birds consisted of House Sparrows, three Skylarks and a Swallow, the nature of the mammals varied according to locality.

A Visit to the Cyclades. By C. G. Bird.—In the Aegean Sea between Greece and Asia Minor.

Birds of Northern Portuguese East Africa. By Jack Vincent. Part VII.

On the Relationship of the Struthioness to the Dinosaurs and to the Rest of the Avian Class with Special Reference to the Position of Archaeopteryx. By Percy R. Lowe.—Dr. Lowe here presents in greater detail his contention that the Struthioness "evolved independently of other avian groups from some generalized ancestor before birds in general had specialized as flying creatures." He states also that the common ancestor of birds and reptiles must have possessed potential genetic factors capable of evolving either avian-reptiles or reptilian-birds and goes on to say that had we been living in the Lower Cretaceous and had the good fortune to come across some ancestral Ostrich-like bird and a bipedal coelurosaurian dinosaur we might have been puzzled to know which was bird and which reptile.

In Archaeopteryx he considers that we have a very specialized and feathered dinosaur—a blind alley product of evolution—Nature's first effort to hit the mark—but an effort that failed and the flying bird was not evolved until millions of years

later! Dr. Lowe presents a mass of interesting data which should be read in connection with Dr. Gregory's paper on the same general subject (Proc. Linn. Soc. N. Y. see p. 340 antea).

British Birds. XXVIII, No. 10. March, 1935.

Notes on Colour Variation and Habits of Short-eared Owl. By T. Russell Goddard.

Birds of Inner London—Additions. By A. H. Macpherson.

On the Habits of Kingfishers. By Philip A. Clancey.—Incubation and fledgling periods, shape and location of nest, development of bill, calls etc., etc.

The bird-banding report shows nearly 50,000 birds "ringed" during 1934.

British Birds. XXVIII, No. 11. April, 1935.

Notes on the Rook. By J. P. Burkitt.—Inspired by reading Yeates 'Life of the Rook' and a realization of how much remains to be known about this interesting bird.

Distribution and Number of the Dipper on the Esk. By William Serle and D. Bryson.

An Index of Heron Population. By E. M. Nicholson.—In connection with the "Census" of 1928 it is proposed to take a sample census every year to ascertain the fluctuation in the numbers of the birds and this report is the first adequate attempt to gather this data.

British Birds. XXVIII, No. 12. May 1, 1935.

Ornithological Report for Norfolk, 1934. By B. B. Riviere.

An attempt to Chart Fluctuations in the Song of Song Thrush, Blackbird and Chaffinch. By J. P. Burkitt.

Bulletin of the British Ornithological Club. CCCLXXXIV. February 28, 1935.

Eurillas virens zanzibaricus (p. 111) is described by Parkham from Zanzibar. Mathews proposes *Pucheranphus* with *Catarrhactes adeliae* Homb. & Jacq. as type; and *Chlorisitta* for *Sitta chloris* Sparrm., *Acanthositta* being shown to belong to the Bush Wrens (p. 113).

Bulletin of the British Ornithologists' Club. CCCLXXXV. March 28, 1935.

G. L. Bates discusses certain African birds and proposes *Serinus angolensis philbyi* (p. 120) and *Cinnyris habessinicus kinneari* (120) both from Arabia.

Thesiger and Meynell describe *Gymnoris pyrgita dankali* (p. 122) from eastern Abyssinia.

Bulletin of the British Ornithologists' Club. CCCLXXXVI. April 30, 1935.

Major Allan Brooks criticised the treatment of several North American forms by recent authors as subspecies of European species and vice versa.

David Bannerman commented on birds from the Gold Coast and described *Anthoscopus flavifrons waldroni* (p. 131); N. B. Kinnear proposed *Fulvetta ludlowi* (p. 134) from Eastern Bhutan; G. L. Bates, *Ammomanes cinctura kinneari* (p. 140) Arabia. O. Neumann described new forms of *Crypsirina*, *Cyanoderma* and *Bubo* from Siam, Java and Borneo respectively.

The Oölogists' Record. XV, No. 1. March, 1935.

Consists mainly of articles reprinted from other journals.

The Avicultural Magazine. (IV series) XIII, Nos. 3, 4, and 5. March to May, 1935.

Some British Birds in New Zealand. By S. D. Potter (March.)

Duck Hybrids [in Captivity]. By E. Hopkinson.—A long list, some of them remarkable combinations such as the Gadwall and Wood Duck. (March.)

Notes on the Birds of Fiji. By S. D. Porter. (April.)

Where Rolls the Rio Grande. By J. B. Housden.—The bird which most impressed the author was the "Red-winged Tanager" which sang repeatedly by the "rolling river" but he offers us no further clue to its identity. This is unfortunate as it would appear to be a new species to the 'Check-List' if not to science! (April.)

Notes on the Birds of St. James Park. By Thomas Hinton, with drawings by Roland Green. (May.)

Bird News and Notes. XVI, No. 5. Spring, 1935.

Some Notes from St. Kilda. By Niall Rankin.

From the Lighthouse. By a lighthouse keeper.

There are a great many interesting facts concerning bird protection in England and the activities of the Royal Society for the Protection of Birds both in this issue and in the annual report for 1934. It seems a pity, however, that nearly four-fifths of the latter publication has to be taken up with a list of members and contributions but perhaps this is a necessity required by the management as in some publications in America.

The Emu. XXXIV, Part 4. April, 1935.

The Genus *Sericornis* in Australia. By A. G. Campbell.—With an excellent color plate of the eggs and distributional maps for the several species.

The Food of Australian Birds. By A. M. Lea and J. T. Gray.—A compilation of published records with a number of original ones. No attempt at comparative importance of the food items is made, simply a list of them.

Notes on a Few Birds of the Rochester District. By J. Bright.

Notes on the Wrens of Western Australia. By F. L. Whitlock.

Additions and Corrections to *Systema Avium Australasianarum*. By G. M. Mathews.

The South Australian Ornithologist. XIII, Part 1. January, 1935.

Many notes and annotated lists from the region covered. Also an account with photograph of Cormorants nesting on the platform of a beacon light.

Alauda. (Ser. 3.) VI, No. 4. October–December, 1934. [In French.]

On Geographic Variation in *Dryobates major*. By George P. Dementieff.

Observations on Bird Life in Anatolie. By H. Kummerlowe and G. Niethammer.

Notes on the Roquette and the Migration of *Perdix perdix* in European Russia. By G. P. Dementieff and others.

Comments on Our Four Warblers. By H. Jouard.—Species of *Phylloscopus*, their migration, distribution, song etc.

On the Cuckoo. By J. deChavigny.

Ornithological Notes from the Swiss Alps. By Paul Poty.

Avifauna of the Isle d'Yeu. By N. Mayaud.

Alauda. (Ser. 3.) VI, No. 5. January–March, 1935. [In French.]

Report of the Committee for the Unification of the French Names of Birds. By Maurice Boubier.

A Contribution to a Study of the Food of Aquatic Birds. By P. Madon.

On the Presence in France of the 19th Cycle of *Alectoris b. barbara*. By N. Mayaud.

Identification in Natural History. A New Method. By P. Poty.

L'Oiseau. V, No. 1. 1935. [In French.]

Latham's Megapode. By J. Delacour.—Discussion of its habits; with photographs from life.

A Collection of Birds from the Territory of Kouang-Teheou-wan. By P. Jabouille (continued).

Systema Avium Rossicarum. By S. A. Buturlin and G. P. Dementieff (continued).

The Problem of the Migration of the White Storks of North Africa. By G. Bouet.

- Ulcers in the Digestive Tract of Birds. By R. Salgues.
Many local notes and avicultural items.
L'Oiseau. V, No. 2. 1935. [In French.]
Report of the Committee for the Unification of the French Names of Birds. By M. Boubier.
On the Parroquets of the Genus *Tanygnathus*. By Marquis Hachisuka. *T. megalorhynchus obiensis* (p. 216) Obi; *T. m. batchianensis* (p. 216) Batchian; *T. m. fuliginosus* (p. 217) Sanghir.
Contributions to our Knowledge of the Migrations of *Syrhaptes paradoxus* Pallas. By A. M. Sudilovskaia.
Ornithology of Lower Brittany. By E. Lebeurier and J. Rapine (continued).
The Role of Electrico-magnetic Air Currents in the Origin of Bird Migration. By F. Cathelin.
Notes on the Avifauna of the Baleric and Pityusic Isles. By E. L. Bernath.
Archives of Swiss Ornithology. I, No. 5. [In German or French.] October, 1934.
An Analysis of the Migration of *Anas acuta*, *A. penelope* and *A. strepera* in Switzerland. By U. A. Corti.
Family Associations among our Birds. By H. Noll.
Journal für Ornithologie. 83, No. 2. April, 1935. [In German.]
The Rôle of the Conspecific Associate in the Environment of a Bird. By Konrad Lorenz.—A psychological study of behavior.
Investigations of the Functional Anatomy of Birds' Feet. By G. Steinbacher.
The Display of *Serrisoptera wallacei halmaherae*. By Herbert Friedmann.
Journal für Ornithologie. 83, Sonderheft. April 1, 1935. [In German.]
On Ornithology in Jehol. A spring Trip through China, Manchuria and Mongolia. By Hugo Weigold.—An interesting account of the author's experience on the Stolzner Expedition of 1916.
Ornithologische Monatsberichte. 43, No. 2. March-April, 1935. [In German.]
On the Behavior of Males of *Phylloscopus b. bonelli* in Caring for the Young. By F. Heilfurth.
Luscinia svecica of the Scandinavian Peninsula. By F. Steinbacher.
On the Structure of the Gizzard in Euphonia. By G. Steinbacher.
New forms described in the 'Short Notes.'—*Pogoniulus bilineatus rovumensis* (p. 53) by Grote, Mikindani; *Xanthotis polygramma lepidota* (p. 54), and *Clytoceyx rez septentrionalis* (p. 54) by K. Paludan, both from New Guinea.
Beiträge zur Fortpflanzungsbiologie der Vögel. 11, No. 2. March, 1935. [In German.]
A Contribution to the Breeding Biology of *Tringa glareola*. By H. Kirchner.
Observations and Conclusions at the Nest of the Least Bittern. By O. Steinfatt.
A Contribution to the Biology of the Zoological Garden Wood Owl. By O. Schnurre.
Observations of Storks at Breeding Time. By E. Schuz.
Beiträge zur Fortpflanzungsbiologie der Vögel 11, No. 3. May, 1935. [In German.]
A Few notes on the Stork as a Breeding Bird in Austria in 1934. By A. Seitz.
On the Nesting Ground of *Acrocephalus palustris*. By M. Garling.
Breeding Studies of *Acrocephalus dumetorum* and *A. baeticatus*. By H. Grote.
On the Water Supply of Young Birds. By L. Schuster.

- Der Vogelzög.** No. 2. April, 1935. [In German.]
Report on Bird Watching at Rossiten for 1934. By E. Schütz.
Sex and Age Characters in Migrant Birds. IV. By R. Drost.
Mass Flights of *Hirundo rustica* on the Adriatic Coast of Italy in April, 1934. By G. Niethammer.
Many notes on migration in Europe and on banding.
Der Ornithologische Beobachter. 32, Nos. 5-6, 7. February-March, 1935.
[In German or French.]
Observations on the Breeding Place of the Alpine Swift in Solothurn. By H. Arn.
List of Birds Observed in the Delta of the Rhone and Lake Leman. By R. Poncy.
Der Ornithologische Beobachter. 32, No. 7. April, 1932. [In German or French.]
New Observations on the Breeding of *Podiceps cristatus*. By W. Knopfli.
Remarks on the Digestion of the Grebes. By O. Meylan.
Observations on the Food of *Podiceps ruficollis*. By H. Noll and J. Schmalz.
Le Gerfaut. 24, No. 4. 1934. Mutation in the Magpies of Western Siberia. By V. A. Khakaloff.
The Burrowing Owl of California. By Emerson A. Stoner.
Notes on Belgian Birds and on Bird Banding.
Ornis Fennica. XI, No. 4. 1934. [In German or Finnish.]
An Invasion of *Acrocephalus s. scirpaceus* in Finland. By P. Palmgren.
Pairing as an Expression of Ecstasy in a Caged Warbler. By P. Palmgren.
Organ of the Netherlands Ornithological Club. VII, No. 4. April, 1935.
[In Dutch.]
Bird Migration in the Netherlands. By W. H. VanDobben.
Observations on Bird Migration. By J. C. Koch and J. P. Bouma.—Charts to show the number of each species seen on each day.
Owl Invasion in the Winter of 1934-35. By C. G. B. Ten Kate.—*Tyto alba*, *Asio otus* and *flammeus*, *Athene noctua*.
Bird Banding Records.
Kocsag. VII, No. 1-4, 1934. [In German or Hungarian with German Abstract.]
Short Phylogenetic and Systematic Review of the Charadriiformes. By Hans von Boetticher.—With charts of relationship. [In German.]
Bird Life of the Hungarian Junipers. By G. Kolosvary.
On the Biology of *Aquila pomarina* and *A. clanga*. By L. v. Dobay
On the Horny Bill-covering of the Albatross. By Hans von Boetticher. [In German.]
Contribution to the Birds of Prey of the Borsoder Bükkgebirges. By S. Vasarhelyi.
Other notes and articles on Hungarian birds.
Ceskoslovensky Ornitholog. II, Nos. 1 and 2, 1935. [Entirely in Hungarian.]
Devoted to popular bird study and bird protection.
Norsk Ornithologisk Tidsskrift. No. 14-15. April 16, 1935. [In Norwegian.]
Breeding Conditions on *Charadrius hiaticula* and *C. dubius curonicus*. By Kare Oftedal.
Additional Notes from Kroken, Norway. By K. Krough.
Infection from Stomach Worm (ascarid) Fatal to *Falco tinnunculus*. By P. Host.
Observations at Bygland, Norway; with Biology of *Aegolius funereus* and *Falco tinnunculus*.
Odd Nesting of *Anthus pratensis*. By H. Huitfeldt-Kaas.—Two nests in a Starling box.
Flamingo, a New Bird for Norway. By H. Th. L. Schaanning.
Many local notes.

CORRESPONDENCE.

Injury-feigning in Nesting Birds.

Editor of 'The Auk.'

Dr. Herbert Friedmann's splendid study "The Instinctive Emotional life of birds"¹ should provide mental stimulus for field workers in ornithology, it deals so largely with the sort of experiences that out-door ornithologists and oölogists have opportunities for evaluating. I, myself, was particularly struck with the part of his treatise on "fear" that deals with that well-known phenomenon among nesting birds, the apparent "injury-feigning" that tends to distract an enemy's attention from an imperiled nest. Friedmann's conclusion is: "Injury feigning is a compromise between fear and reproductive emotions. Fear impels the bird to leave its nest; the bond to the nest and eggs or young prevents the bird from doing so; the result is a crippled departure. In some regions where enemies are absent, as in the Galapagos Islands, birds seem to have little or no fear."

It seems to me (with no claim, however, to proficiency in the study of behavior) that certain of my own observations point in other directions. Friedmann's reference to Galapagos birds in particular reminded me of a peculiarly surprising fact regarding one species that seems to me in flat contradiction to his belief. I will return to this later.

For one thing, this action appears to be a racial peculiarity, invariably exhibited in some species, never in others, which in itself argues against a purely mechanical cause. More than that, is it not a habit that is common to all species within certain groups, never exhibited within other groups? The Killdeer is taken by Friedmann as an example of the injury-feigning devotee; from my experience with that and several other species of Plovers, and from my reading, I infer that it is the usual resort of many, perhaps all, of the species of this group. In the several species of Doves with which I am familiar, injury-feigning is resorted to in most elaborate manner. But are there any other kinds of birds that do this? Doves and Plovers happen to be the only ones within my own experience, all, at least, that I can now recall having seen or read about, unless Kipling's account of the actions of Darzee, the tailor-bird, is based on fact.

On the other hand, in contrast to the Plovers, there are some species of waders (the Lesser Yellow-legs occurs to me as a conspicuous example) that never feign injury, but hurl themselves at an intruder with shrieks of protest. Is the Plover more stricken with fear than the Yellow-legs? I think not. I can not recall that I have ever seen a Passerine bird resort to injury-feigning. Gulls and Terns hover about, screaming and diving at one's head; I have never seen a Gull or Tern posing as a wounded bird.

I have had occasion to observe the Semipalmated Plover (*Charadrius semipalmatus*) on the breeding grounds many times. My appearance on the broad sand-bars or gravelly river beds that formed their home was heralded at once by several birds circling over-head with plaintive calls and one or more painfully fluttering over the ground before me. My skill never sufficed to find a nest by search, and I never flushed a parent bird from the nest, but I found several by stratagem. Concealing myself in a willow thicket at a distance, perhaps two hundred yards from where I thought the nest might be, I watched the birds with binoculars. Once that I was out of sight they soon settled down, and it was not hard to detect a female that was

¹ The Psychoanalytic Review, Vol. XXI, nos. 3 and 4, July and October, 1934.

planning to return to her nest. After several false moves and some wide circling she would make her return, so swiftly and unobtrusively that it was hard to follow her movements. This much is certain, that, when on approach of danger the incubating bird left the nest, she ran a long distance from it and toward the intruder before beginning the injury pretense. And invariably her mate, feeding nearby, and often other neighboring pairs, joined in the demonstration.

To return to the Galapagos example. On those islands there is a species of native Dove (*Nesopelia galapagoensis*). As with the other island birds, it is devoid of fear of man, feeding at one's feet or perching placidly within arm's reach. But, and this on islands where there are no native enemies to menace the nest, an incubating Dove, when approached by man flutters painfully away according to the approved Dove technique. I cannot believe that this bird is any more frightened in this situation than are the neighboring Frigate-birds and Boobies, that flatly refuse to leave their nests at all. The Dove is using a method of protection that has been implanted among her reactions for ages past, and it may be noted that this utterly useless but quite characteristic habit has survived through a period sufficiently prolonged to have produced what we designate a separate genus. Frigate-bird and Booby, too, are using the one method of protection that they know to be efficacious, for unless a nest is actually occupied it will certainly be robbed of contents or structural material by neighboring Frigate-birds. A brooding Frigate-bird may be lifted from its nest, but howsoever reluctant it is to leave, contending emotions will not result in an imitation of injury.

Ptarmigans, especially the Willow Ptarmigan are extremely aggressive in defense of their young, and the blustering attack of parent birds shows no indication of fear. Just in proportion as the young grow and develop speed in their departure, so do the parents relax in their tactics to hinder pursuit. I have never seen a Ptarmigan use the "wounded-bird ruse," and I cannot recall having seen any other grouse or any Quail do so. On June 15, 1934, I found a nest of White-tailed Ptarmigan (*Lagopus leucurus*) (some fifteen miles northeast of Atlin, British Columbia, at an altitude of about 5000 feet). It was on an open hill-side where the brooding bird had an uninterrupted view of at least half a mile in every direction, but she sat on her nest unmoved, although I almost stepped on her. I sat quietly alongside and after a few moments ventured first to touch her, then to stroke her back, at which she hissed but made no other demonstration. I wished to see what she was sitting on, and to do so I finally had to put my hand beneath her breast and gently lift her from the nest, disclosing eight eggs apparently well incubated. Even then she did not leave, but with wings and tail partly spread and body feathers ruffled, she pecked at my hand and arm and slipped back upon her eggs as soon as I released her. In every action she might have been a "broody" Bantam Hen, well used to being handled. With my hand pressing against her breast I could not detect any quickening of the heart beats; she emphatically was not frightened. Just how these facts should be marshalled in any discussion of bird psychology I confess I do not know, but detail them here as of possible value to some more competent student of behavior. What I would like to know is whether this bird would have acted the same toward an approaching bear or coyote. If so, she and her eggs would certainly have been destroyed. Or did she class me as one with the harmless caribou and moose?

Here is another incident in bird behavior that I will not attempt to classify or explain. A Lesser Yellow-legs (*Totanus flavipes*) was shot, one of several birds that were making the hullabaloo usual to these waders when eggs or young are approached, and making this fuss only in a rather restricted area. On dissection of this bird it

was evident that it had not been breeding, and that it would not do so that summer. At the same time there were flocks of non-breeding Yellow-legs in other marshes that never raised any objection to my near approach.

To return to the subject of injury-feigning by incubating birds, my objections to Friedmann's mechanistic explanation of this ruse, briefly summarized, are as follows. It is performed by certain species (perhaps by all species of certain groups), while other species nesting under closely similar conditions never do it. A nesting Plover, on the first appearance of danger, will unobtrusively leave her nest, hasten toward the menace, and only begin her antics when close to the enemy. There are many birds whose nests are usually found (by me, at any rate) by flushing the brooding parent at very close range (Meadowlark and Junco, for instance), and who do not resort to the cripple mimicry.

On the whole, I am inclined to doubt that any mature bird is really frightened (that is, terror stricken) until it has received an injury, or until the moment when it realizes that its usual modes of escape or defense are fruitless. Hasty departure from danger does not imply fear.

HARRY S. SWARTH

California Academy of Sciences,
San Francisco.

OBITUARIES.

ELIZABETH BRAXTON DAVENPORT, an Associate of the American Ornithologists' Union since 1898, died at Brattleboro, Vt., Aug. 28, 1934, shortly after her 89th birthday. Mrs. Davenport was the daughter of John and Amelia (Ewing) Simpson and was born in Philadelphia, Pa., Aug. 25, 1845. Her father, who was one of the earliest manufacturers of woolen fabrics in Pennsylvania, came from England in 1820, and on her mother's side her ancestors were among the early Quakers who settled in the same State. At the age of 17, on May 25, 1862, she married Alonzo Cook Davenport, of Sunderland, Vt., who became one of the prominent business men of Brattleboro and who died in 1899. Mrs. Davenport and her husband took a prominent part in the establishment of the Brattleboro Home for the Aged and long after his death, when her own health began to fail, she took up her residence in this Home. During the last three years of her life her sight failed almost completely, but she maintained her interest in her friends and in her former activities practically up to the time of her death.

Mrs. Davenport was one of the outstanding early members of the Union and of the Vermont Botanical and Bird Club. She was the author of a brief list of the 'Birds of Windham and Bennington Counties,' 1907, but for the most part she relied on precept rather than the pen in accomplishing her objectives. Although she published comparatively little on birds, through force of example she exerted an inspiring influence on those with whom she came in contact, in behalf of sound bird study, botany, and wild life conservation. From early childhood she had developed a deep interest in birds and flowers. In addition to her membership in the Union and the Vermont Botanical Club she was a member of the National Association of Audubon Societies, the American Museum of Natural History, the Biological Society of Washington, the American Association for the Advancement of Science, the American Fern Society, the Torrey Botanical Club and the Green Mountain Club. In philanthropic work her interests were equally broad and were manifested in the Red Cross, the Vermont Children's Aid Society and the Women's Educational and Industrial Union of Brattleboro.

Mrs. Davenport was a keen observer, an energetic field worker and a deep believer in the importance of studying birds and flowers in life. She was one of the most active members of the American Ornithologists' Union Expedition to California in 1903 and took part in all of the field trips including those to Los Banos, Yosemite Valley, and the Farallon Islands. In later years when failing health curtailed arduous outdoor exercise, instead of resigning from the several organizations in which she formerly took an active part, as so many are inclined to do, she still maintained her membership and her interest in various activities. Surely such an example should be an inspiration to those who take a real delight in nature study and do what they can to share their interest with others and help to make the world a better place in which to live.—T. S. P.

NOTES AND NEWS.

THE COMMITTEE in charge of the Toronto Meeting of the A. O. U. October 21-24, 1935, has its plans practically completed.

Headquarters will be at the Royal York Hotel which connects directly by tunnel with the Union Station where all trains arrive. Single rooms \$3 per day, double rooms \$5. Accommodations at cheaper rates may be had at the adjacent Walker House.

The meetings will be held at the Royal Ontario Museum.

Special buses (10 ct. fare) will leave the hotel at 9 and 9:15 A. M. and return at 5:15 and 5:30 P. M. Luncheon (65 cts.) served daily at "Diana Sweets" Restaurant adjacent to the Museum.

Informal reception on Tuesday evening at the Museum. Annual dinner (\$2.00) at the Hotel on Wednesday. There will be a field day on Friday at Hamilton where the wild fowl on Hamilton Bay may be studied. Further details to be had from Mr. L. L. Snyder, Secy., Royal Ontario Museum.

With so much information furnished at such an early date it behooves all members of the Union to make their arrangements to be present at the meeting at once, so that no complications will arise at the last minute to prevent them from making the trip.

ON APRIL 26, in commemoration of the sesquicentennial of the birth of John James Audubon, the Library of Congress placed a special collection of Auduboniana on exhibition in the Rare Book Room. This exhibit intended to illustrate the naturalist's principal works, occupied two large tables to accommodate the elephant folios of the 'Birds' and 'Quadrupeds' and two table cases. One of these cases contained the various editions of the 'Ornithological Biography,' the 'Birds of America' and the 'Quadrupeds'; the other, the journals, biographies, published letters, principal portraits and a special map prepared by Frank Bond showing Audubon's travels and the important places associated with his work. Examples were shown of the four editions of the 'Ornithological Biography,' the first and last octavo editions of the 'Birds of America,' and two or three editions of the biography by Mrs. Horace St. John. This collection which remained on exhibition for a month afforded an unusual opportunity of comparing the various editions of Audubon's works and brought to light several bibliographic details which apparently have thus far escaped notice.

IN CONNECTION with the Deane Collection of Portraits in the Library of Congress, Frank Bond and the Secretary of the Union are preparing an index of the principal bird artists. This list contains as far as possible the full name, date of birth, and address of each living artist, and the names, dates of birth and death, and reference to a published biography of those who are deceased. In each case references are given to one or two works in which the artists' work has appeared. The index is world wide in scope and already includes about 400 individuals.

THE COOPER ORNITHOLOGICAL CLUB held a most successful tenth annual meeting at the University of California in Berkeley, May 24-26, 1935. Twenty papers were presented. There was an inspection of the collections in the Museum of Vertebrate Zoology on the afternoon of May 24; the annual dinner on the evening of the 25th and an all day field trip to Marin County on the 26th.

TWO ADMIRABLE "Teaching Units" by Ellsworth D. Lumley have recently been issued by the Emergency Conservation Committee on "Eagles" and "Fish-eating Birds," in which the unjust attacks on these species by gunners, fishermen and others are fairly met and refuted. Prof. F. H. Herrick has prepared the foreword for the first and Mr. W. L. McAtee for the second.

Copies may be had from the Committee, 734 Lexington Ave., New York City, at 10 cts. each; 12 for \$1.00; 100 for \$7.50. Copies of these pamphlets should be in all school libraries.

THE DELAWARE VALLEY ORNITHOLOGICAL CLUB held its forty-fifth annual meeting on the evening of January 3, 1935. Officers elected for the current year were President, Julian K. Potter; Vice President, Arthur C. Emlen; Treasurer, Henry T. Underdown and Secretary, John A. Gillespie. Two of the founders were present, William L. Baily and Witmer Stone.

The continued activities of members of the Club who have moved away from Philadelphia are interesting. Herbert L. Coggins became a president of the Cooper Ornithological Club; the late Chreswell J. Hunt, a vice-president of the Chicago Ornithological Club; Robert T. Moore, an active collector of Neotropical birds, with many trips and publications to his credit, resident at Pasadena, Calif.; the late H. L. Graham, active in the California Audubon Society work; David Harrower, doing excellent work at Woodmere Academy, Long Island, in stimulating ornithological interests in the students; Edw. L. Caum, resident in Honolulu where he has published papers on Hawaiian birds; A. E. Clattenburg, studying birds at Athens, Greece, in spare time from embassy work; Stuart T. Danforth, our authority on the birds of Puerto Rico; R. T. Young, professor in the University of North Dakota, formerly with the Biological Survey, where T. D. Burleigh is now an active staff member; Dr. Max M. Peet, reviving his bird work at the Ann Arbor Museum after a long surgical career; while C. H. Rogers is the ornithologist at the Princeton museum, E. L. Poole at that in Reading, Pa. and J. T. Emlen in various field work for state conservation activities. Richard Harlow, now football coach at Harvard, has been discovering rare nests during vacations from athletic duties.

THE WEST CHESTER (PA.) BIRD CLUB held its 20th anniversary meeting on June 8, 1935, with a large attendance of members and visitors. A history of the Club was read by the Secretary, who was introduced by the President, Isaac G. Roberts. An illustrated lecture was delivered by Arthur H. Hadley on 'Bird Life on the Gulf Coast' and Dr. Witmer Stone, an honorary member, made a few remarks on recent ornithological publications.

THE EARLY publication is announced of 'The Birds of the Connecticut Valley in Massachusetts' by Aaron C. Bagg (Holyoke, Mass.) and Samuel A. Eliot, Jr. Pre-publication price \$3.25. Publication to begin after 500 copies have been subscribed for.

THE VOLUME of plates illustrating Dr. Roberts' 'Birds of Minnesota,' has been selected by the American Institute of Graphic Arts for its fifth annual exhibit of American Book Illustration.

FROM NUMEROUS comments that come to us we find that we are not alone in deploring the change in make-up of two notable journals that come to us for review. 'Natural History' has so far departed from its former dignified appearance that it too closely approaches the cheaper magazines of fiction that one sees on the news

stands. While its text matter remains of a very high order, the practise of massing pictures of all sorts and sizes on a single page, not a few of them extending over the edge of the paper, and with display captions, recalls the newspaper picture sheet and is liable to give the casual observer the idea that the articles are of the same sort. Such a magazine surely does not have to compete with these cheap publications and we can see no reason for this make-up except the modern craze "to be different."

'Bird-Lore' too, we are sorry to see is beginning to show the same policy. It, however, has adopted another, quite indefensible, practise of printing advertisements on the back of the first and last leaves of the text so that one cannot have the journal bound without including these "eye-sores" in the volume. This, we trust, is simply an oversight.

As to the constant change in the cover design, another practise borrowed from the popular journals, there may be much said on both sides. Mr. Peterson's beautiful drawings on the 'Bird-Lore' covers are very attractive, but how much more attractive they would be as white-paper frontispieces, and as but few persons bind in the covers, the drawings will usually be lost in the bound sets.

Somehow we like the conservative cover of 'The Ibis' depicting the self same Ibis that was put there in the time of Salvin, Godman, Newton and the elder Sclater and we like to recall Dr. Chapman's plea, in connection with his 'In Memoriam' remarks on Louis Agassiz Fuertes, that the A. O. U. retain Fuertes' Auk on the cover of its journal for all time as a sort of memorial to the artist.

By changing its cover design, too, a journal to some extent loses its identity and we cannot recognize it off hand as of yore. We do not have to look twice to pick out the 'National Geographic' while in dignity of text and illustration it leaves little to be desired.

'THE AUK' is once more indebted to Mr. Robert Thomas Moore for a beautiful color plate, illustrating, this time, the remarkable new species of Jay which he describes on p. 274.

IN A RECENT pamphlet published by the Biological Survey the value of food habit research in the economic study and administration of wild life is set forth in a most convincing way with extracts from publications or original letters from all over the country from those actively engaged in the work. This sort of research carried on since the foundation of the Bureau and from 1916 to 1934 under the able direction of Mr. W. L. McAtee has given us a wealth of reliable information which is accepted as authoritative by all economists, and used as the basis for protection and control.

THE AUK

A Quarterly Journal of Ornithology

ORGAN OF THE AMERICAN ORNITHOLOGISTS' UNION

Edited by Dr. Witmer Stone

ACADEMY OF NATURAL SCIENCES, LOGAN SQUARE

PHILADELPHIA, PA.

To whom all articles and communications intended for publication and all books and publications for review should be sent.

Manuscripts for leading articles must await their turn for publication if others are already on file, but they must be in the editor's hands at least six weeks before the date of issue of the number for which they are intended, and manuscripts for 'General Notes,' 'Recent Literature,' etc., not later than the first of the month preceding the date of issue of the number in which it is desired they shall appear.

Twenty-five copies of leading articles are furnished to authors free of charge. Additional copies or reprints from 'General Notes,' 'Correspondence,' etc., must be ordered from the editor when the manuscript is submitted.

THE OFFICE OF PUBLICATION

8 WEST KING STREET, LANCASTER, PA.

Subscriptions may also be sent to W. L. McAtee, Business Manager, 3200 22d Street N., Cherrydale, Va. Foreign Subscribers may secure 'The Auk' through H. F. and G. Witherby, 326 High Holborn, London, W. C.

Subscription, \$4.00 a year. Single numbers, one dollar.

Free to Honorary Fellows, and to Fellows, Members, and Associates of the A. O. U., not in arrears for dues.

OFFICERS OF THE AMERICAN ORNITHOLOGISTS' UNION

President: JAMES H. FLEMING, 267 Rusholme Road, Toronto, Canada.

Vice Presidents: ARTHUR CLEVELAND BENT, Taunton, Mass., HERBERT FRIEDMANN, U. S. National Museum, Washington, D. C.

Secretary: T. S. PALMER, 1939 Biltmore St., Washington, D. C.

Treasurer: W. L. MCATEE, 3200 22d Street N., Cherrydale, Va.

AVAILABLE PUBLICATIONS OF THE

American Ornithologists' Union

FOR SALE AT THE FOLLOWING PRICES.

Address AMERICAN ORNITHOLOGISTS' UNION

Care of W. L. McAtee, 3200 22d Street N.

Cherrydale, Va.

The Auk. No complete sets on hand. Volumes for 1891 and 1894 to 1934 (except those for 1897, 1902, 1903, 1904, 1905, 1911, 1919, 1920, 1924, 1929 and 1930) \$4.00 each; single numbers \$1.00 each.

Index to The Auk. (Vols. I-XVII, 1884-1900) and Bulletin of the Nuttall Ornithological Club (Vols. I-VIII, 1876-1883), 8vo. pp. vii + 426, 1908. Paper, \$3.25.

Index to The Auk. (Vols. XVIII-XXVII, 1901-1910), 8vo. pp. xviii + 250. 1915. Paper, \$2.00.

Index to The Auk. (Vols. XXVIII-XXXVII, 1911-1920), 8vo. pp. xviii + 339. 1929. Cloth \$5.00. Paper \$4.00.

Index to The Auk. (Vols. XXXVIII-XLVII, 1921-1930) 8vo. pp. xxiii + 328, 1934. Cloth \$4.00. Paper 3 00.

Check List of North American Birds. Fourth Edition (latest), entirely revised, 1931. Cloth, 8vo. pp. xix + 526. \$4.00.

Check List of North American Birds. Second Edition, revised, 1895. Cloth, 8vo. pp. xi + 372. \$1.15.

Code of Nomenclature. Revised Edition, 1908. Paper, 8vo. pp. lxxxv. 50 cents.
Original edition. 1892. Paper, 8vo. pp. iv + 72. 25 cents.

A. O. U. Official Badge. An attractive gold and blue enamel pin, with Auk design, for use at meetings or on other occasions. Post-paid, 50 cents.